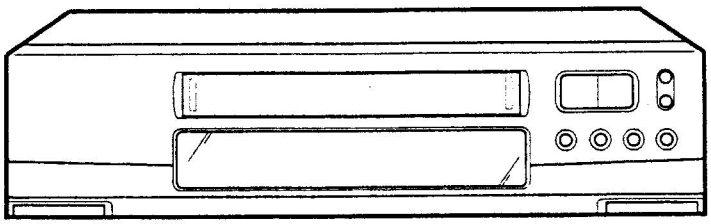
Service Manual

ORION

VH-501

VCR655A Otake

VIDEO CASSETTE RECORDER



VHS
PAL

SPECIFICATIONS

Power Source :	AC230V/50Hz
Power Consumption :	Approx. 23W
Operating Temperature :	5℃ to 40℃
Television System :	CCIR : 625 lines,50 fields PAL-Farbsignal
Video Recording System :	2 rotary heads, helical scanning system Luminance : FM azimuth recording Color signal : Converted subcarrier phase shift recording
Heads:	Video : 2 rotary heads Erase : 1 full track erase head Audio/Control : 1 stationary head
Audio Track :	1 track
Tape Format :	12.65mm high density tape
RF Output Channel :	36 (± 4) channel
Tape Speed:	23.39mm/s
F.FWD/REW Time :	Approx. 2 minutes 30 seconds (with E-180 Cassette Tape)
Input Level :	VIDEO : 1.0Vp-p, 75 ohm unbalanced AUDIO : 500mV, 50k ohm unbalanced
Output Level :	VIDEO : 1.0Vp-p, 75 ohm unbalanced AUDIO : 500mV, 1k ohm unbalanced
Weight :	4.0 Kg
Dimension :	380(W) × 92(H) × 280(D) mm

Design and specification are subject to change without notice.

SERVICING NOTICES ON CHECKING

1. KEEP THE NOTICES

As for the places which need special attentions, they are indicated with the labels or seals on the cabinet, chassis and parts. Make sure to keep the indications and notices in the operation manual.

2. USE THE DESIGNATED PARTS

The parts in this equipment have the specific characters of incombustibility and withstand voltage for safety. Therefore, the part which is replaced should be used the part which has the same character.
Especially as to the important parts for safety which is indicated in the circuit diagram or the table of parts as a ⚠ mark, the designated parts must be used.

3. PUT PARTS AND WIRES IN THE ORIGINAL POSITION AFTER ASSEMBLING OR WIRING

There are parts which use the insulation material such as a tube or tape for safety, or which are assembled in the condition that these do not contact with the printed board. The inside wiring is designed not to get closer to the pyrogenic parts and high voltage parts. Therefore, put these parts in the original positions.

4. PERFORM A SAFETY CHECK AFTER SERVICING

Confirm that the screws, parts and wiring which were removed in order to service are put in the original positions, or whether there are the portions which are deteriorated around the serviced places serviced or not. Check the insulation between the antenna terminal or external metal and the AC cord plug blades. And be sure the safety of that.

HOW TO ORDER PARTS

Please include the following informations when you order parts. (Particularly the CHASSIS CODE.)

1. MODEL NUMBER and CHASSIS CODE
   You can find it in the back of your unit.
2. PART NO. and DESCRIPTION
   You can find it in your SERVICE MANUAL.

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DISASSEMBLY INSTRUCTIONS

1. REMOVAL OF MECHANICAL PARTS AND P.C. BOARDS

1-1: TOP CABINET AND FRONT CABINET (Refer to Fig. 1-1)

1. Remove the 4 screws ①.
2. Remove the Top Cabinet in the direction of arrow (A).
3. Disconnect the following connector. (CP651 4 pins)
4. Unlock the 2 supports ②.
5. Remove the Front Cabinet in the direction of arrow (B).
6. Remove the 3 screws ③ and remove the Operation PCB.

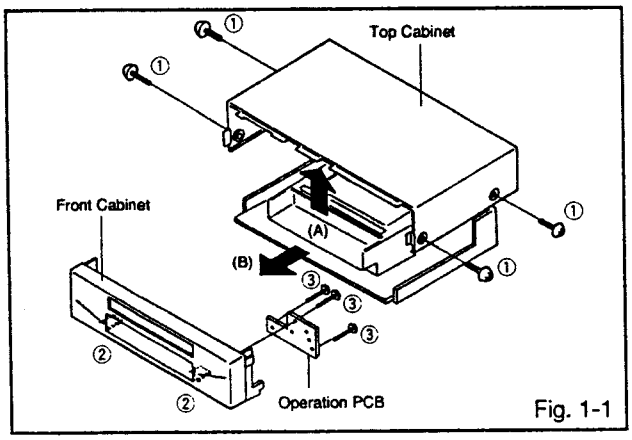


Fig. 1-1

1-2: LOCATION OF P.C. BOARDS (Refer to Fig. 1-2)

CAUTION: BEFORE ATTEMPTING TO REMOVE OR REPAIR ANY PCB, UNPLUG THE POWER CORD FROM THE AC SOURCE.

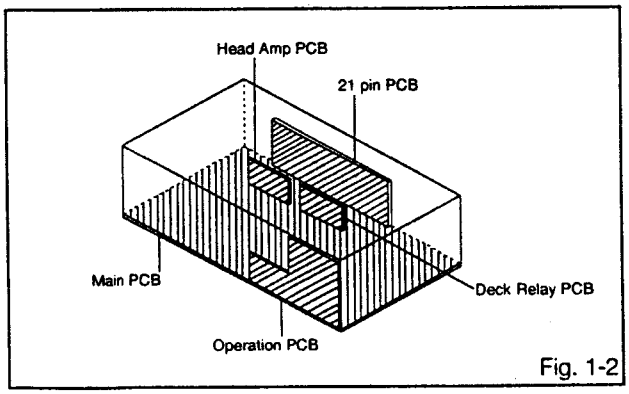


Fig. 1-2

1-3: BOTTOM CHASSIS (Refer to Fig. 1-3)

1. Unlock the 2 supports ①.
2. Remove the Bottom Chassis in the dirrection of arrow.

NOTE

AC Cord must be removed from the AC Jack before PCB and Deck Chassis can be removed.

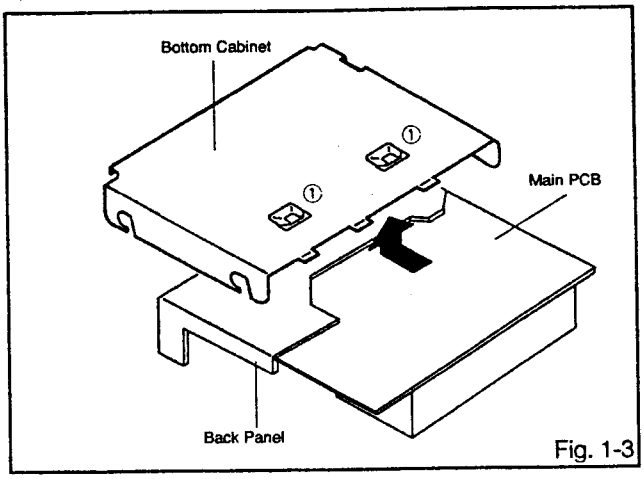


Fig. 1-3

1-4: FLAP (Refer to Fig. 1-4)

1. Open Flap to 90° and flex in direction of arrow (A), at the same time slide in direction of arrow (B).
2. Then lift in direction of arrow (C).

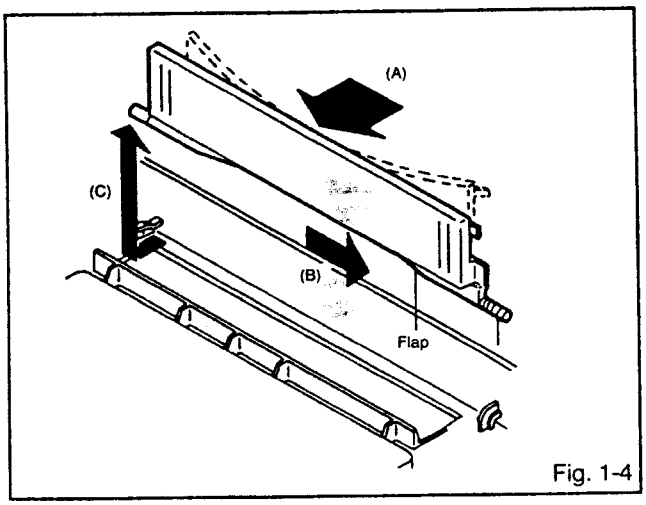


Fig. 1-4

1-5: MAIN PCB (Refer to Fig. 1-5)

1. Remove the 3 screws ①.
2. Disconnect the 2 connectors (CY1003 20 pins and CY4001 22 pins) and remove the Deck Chassis in the dirrection of arrow.

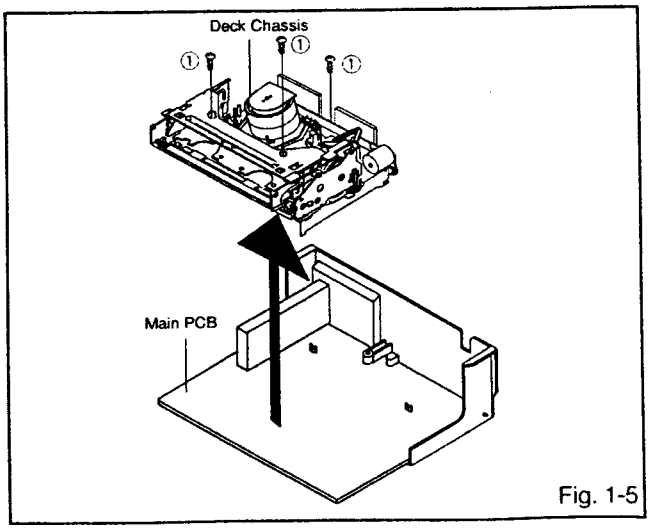


Fig. 1-5

DISASSEMBLY INSTRUCTIONS

1-6: MAIN PCB AND BACK PANEL (Refer to Fig. 1-6)

1. Remove the 2 screws ①.
2. Remove the Main PCB in the direction of arrow.

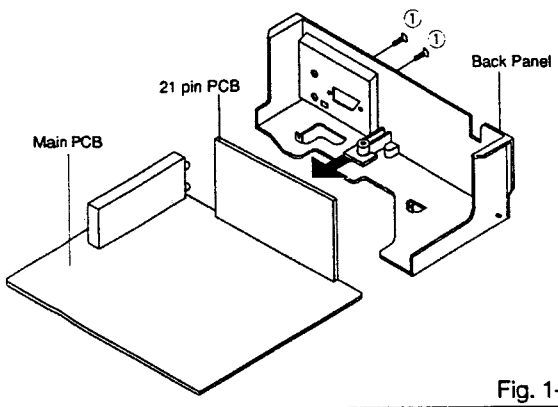


Fig. 1-6

1-7: CHASSIS SECTION AND FRONT LOADING UNIT (Refer to Fig. 1-7)

1. Remove the screw ①.
2. Remove the screw ②.
3. Remove Front Loading in the direction of arrow (A).

NOTE

When installing the Front Loading Unit, align the timing marks and pull the Cassette Holder ASS'Y in the direction of arrow (B).

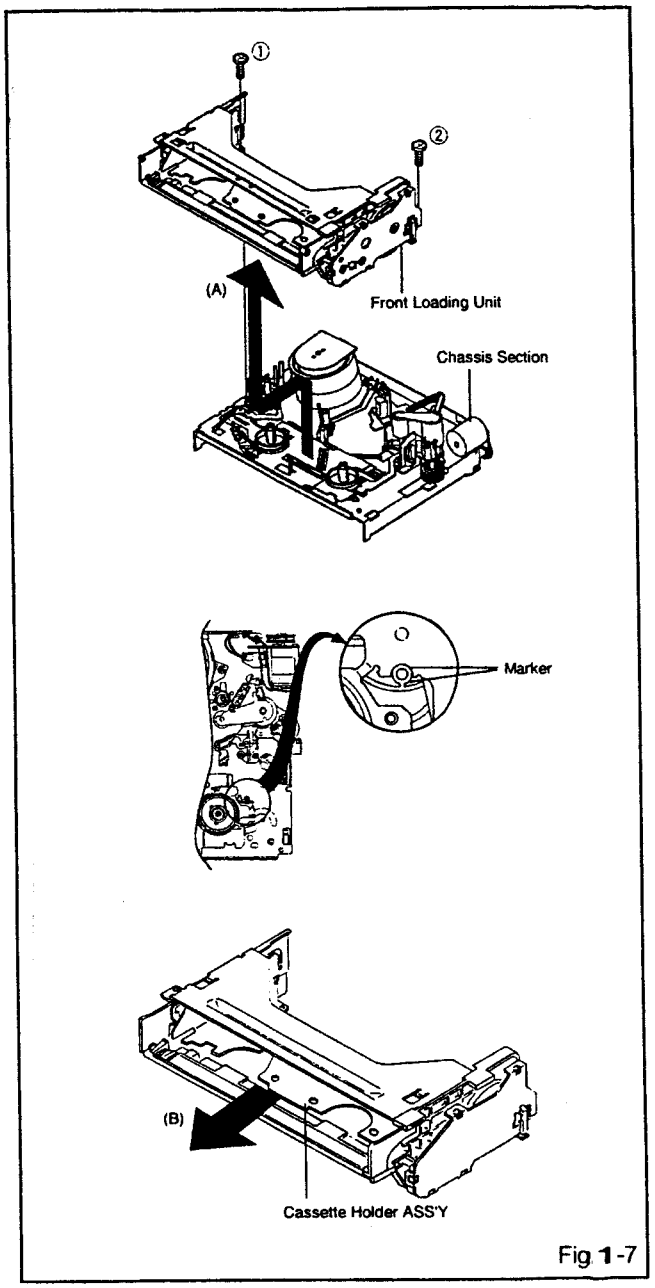


Fig 1-7

DISASSEMBLY INSTRUCTIONS

2. REMOVAL OF DECK PARTS

2-1: LINK GEAR (R) / CLUTCH GEAR (Refer to Fig. 2-1)

1. Unlock support ①.
2. Remove the BOT Sensor cover.
3. Unlock the 2 supports ② and remove the BOT Reflector.
4. Remove the Flap Lever Spring.
5. Unlock the 5 supports ③.
6. Remove the Side Bracket R2 and Spring Earth.
7. Remove the Flap Lever, Link Gear (R) and Cam Gear Ass'y.

NOTE

When installing the Cam Gear Ass'y and Rink Gear (R), align the timing Marks.

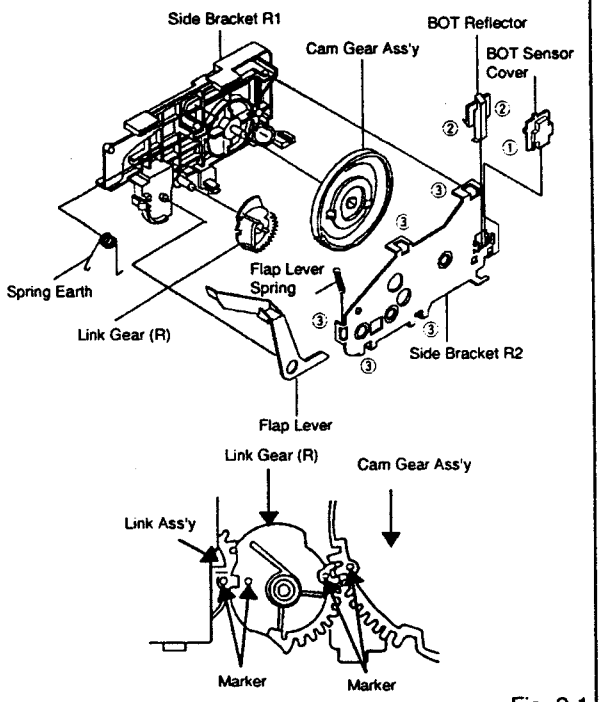


Fig. 2-1

2-2: TOP BRACKET / TAPE PIECE GUIDE (Refer to Fig. 2-2)

1. Unlock the 3 supports ① and remove the Tape Piece Guide.
2. Unlock the 2 supports ②.
3. Remove the Top Bracket with the Side Bracket L.

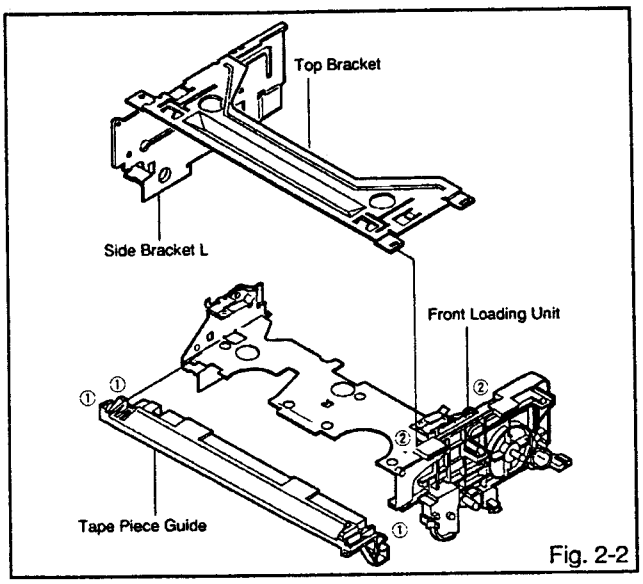


Fig. 2-2

2-3: SIDE BRACKET R1 / CAM GEAR (Refer to Fig. 2-3)

1. Remove the Side Bracket R1.
2. Unlock the support ①.
3. Remove the Joint Gear.
4. Remove the Removing.
5. Remove the Spring Locker R.

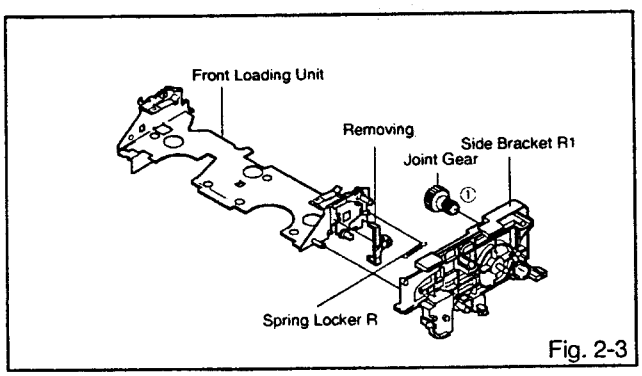


Fig. 2-3

2-4: SIDE BRACKET L (Refer to Fig. 2-4)

1. Remove the screw ①.
2. Remove the Side Bracket L.
3. Remove the Spring Locker L.
4. Remove the Spring Bracket L.

DISASSEMBLY INSTRUCTIONS

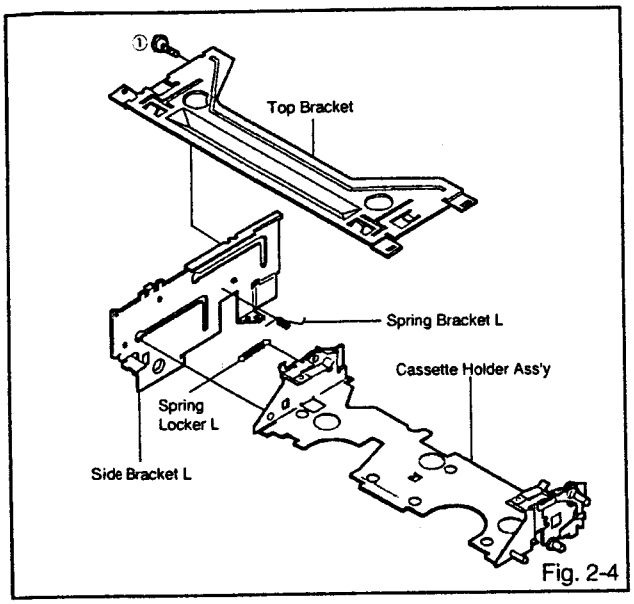


Fig. 2-4

2-5: LINK ASS'Y (Refer to Fig. 2-5)

1. After removing in the direction (A) of Link Ass'y remove the Link Ass'y in the direction (B).

NOTE

Install the (B) first, then install the (A).

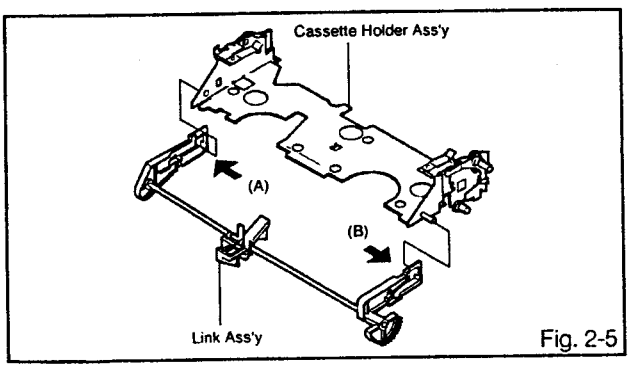


Fig. 2-5

2-6: BRAKE BRACKET (Refer to Fig. 2-6)

1. Remove the Main Brake Spring, S-S Brake Spring, Joint Arm Spring and T-S Brake Spring.
2. Remove the 2 screws ①.
3. Remove the Brake Bracket.
4. Remove the Sub Brake S, Sub Brake T, Main Brake S ASS'Y and Main Brake T Ass'y.
5. Remove the Joint Arm.
6. Remove the Reflector LED.

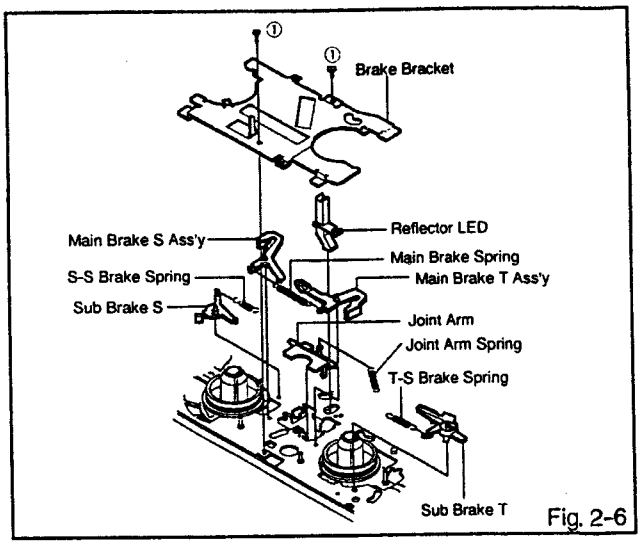


Fig. 2-6

2-7: TENSION BAND (Refer to Fig. 2-7)

1. Remove the Tension Arm Spring 1.
2. Remove the Tension Arm Spring 2.
3. Remove the Tension Adjust.
4. Remove the Tension Arm Ass'y.
5. Remove the Tension Band Ass'y.
6. Remove the Tension Lever 2 Ass'y.

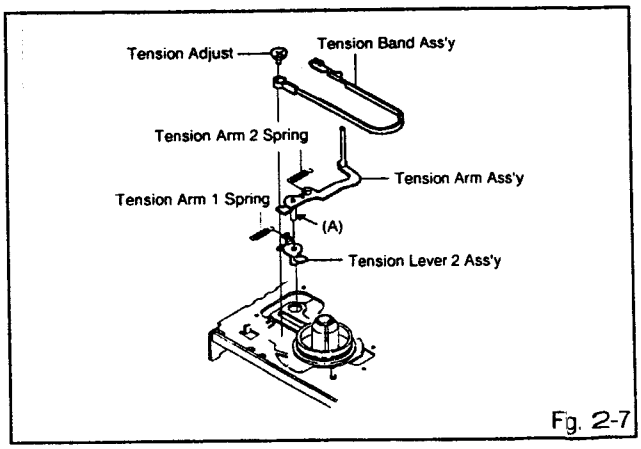


Fig. 2-7

NOTE

1. Install the Tension Band Ass'y without twisting it.
2. After oiling (Kyoudo oil slaidasu #150 the (A).**(Refer to Fig. 2-7)**

2-8: REEL DISK (Refer to Fig. 2-8)

1. Remove the Reel Disk S Ass'y and Reel Disk T Ass'y.
2. Remove the 2 polyslider washers ①.

DISASSEMBLY INSTRUCTIONS

NOTES

1. Installation after Disassembly in section 2-7 1, 2 and 3.
2. The Height Adjustment washers ① are sometimes attached to the back of the Reel Disk.
3. Clean the Reel Disk Shaft and Put in height adjusting washers ①.
4. Be careful not to damage the Tension Band Ass'y at the time of removal and installation.
5. Be careful not to scratch the Reel Disk Shaft with the polyslider washer or the tool at the time of removal and installation.
6. After oiling (Kyoudo oil slaidasu #150 the Reel Disk Shaft, install the new Reel Disk S Ass'y and Reel Disk T Ass'y again.
7. After installation, adjust the height of the Reel Disk. **(Refer to item 1-1 of MECHANICAL ADJUSTMENTS)**
8. After installation, adjust and confirm the tension post position. **(Refer to item 1-2 of MECHANICAL ADJUSTMENTS)**

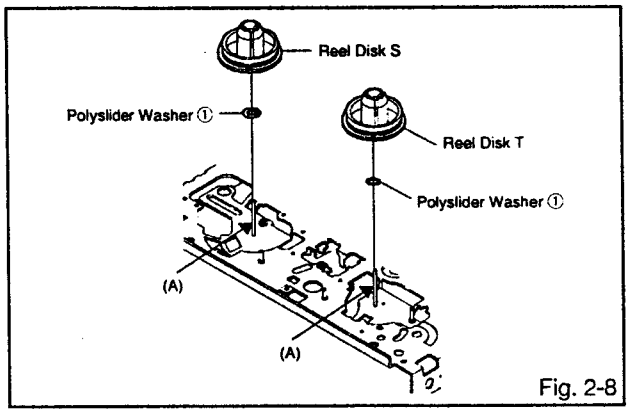


Fig. 2-8

2-9: PINCH ROLLER / CASSETTE OPENER (Refer to Fig. 2-9)

1. Unlock the support ①.
2. Remove the Pinch Roller.
3. Remove the screw ②.
4. Unlock the 2 supports ③.
5. Remove the Cassette Opener.
6. Remove the Spring P5 and Arm P5 Ass'y.
7. Remove the Cam Gear and Cam Pinch Roller.
8. Remove the polyslider washer and Cam P5.

NOTES

1. Do not touch the Pinch Roller. (Use gloves.)
2. When installing the Cam P5, Cam Pinch Roller and Cam Gear, align the timing marks.

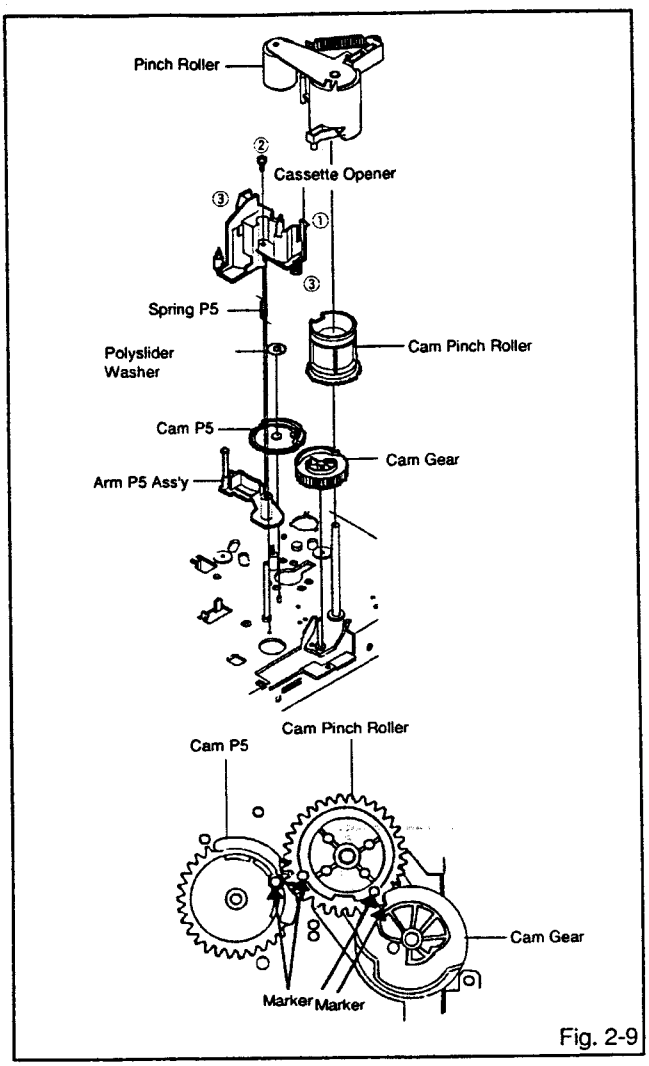


Fig. 2-9

2-10: AUDIO CONTROL HEAD (Refer to Fig. 2-10)

1. Disconnect the conector (CD5001 6 pins) on the Audio Control Head PCB.
2. Remove the 3 screws ①.
3. Remove the 3 Audio Control Head Springs.
4. Remove the Audio Control Head.

NOTES

1. Do not touch the head by any means when replacing the Audio Control Head. (Use gloves.)
2. After replacement, confirm the following adjustment.
   a. MECHANICAL ADJUSTMENTS: ITEM 2-2
   b. MECHANICAL ADJUSTMENTS: ITEM 2-3

DISASSEMBLY INSTRUCTIONS

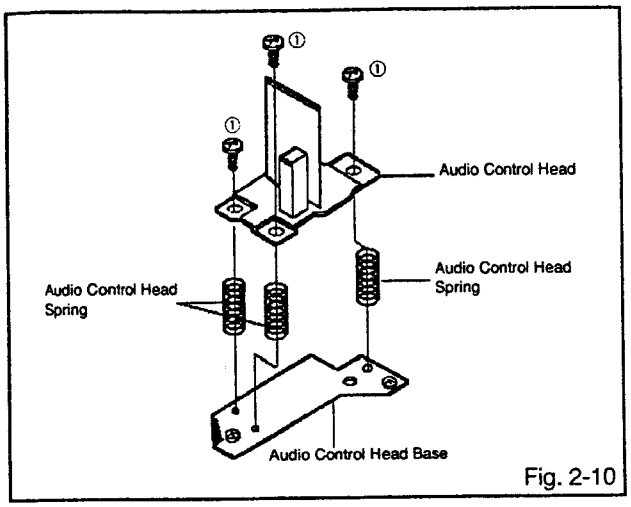


Fig. 2-10

2-11: CYLINDER UNIT (Refer to Fig. 2-11)

1. Disconnect the following connectors. (CD2001 7 pins and CP4101 4 pins)
2. Remove the Joint Screw, then remove the Azimuth Spring.
3. Remove the 2 screws ①, then remove the Polyslider Washer and Cylinder Unit from the Main Chassis.

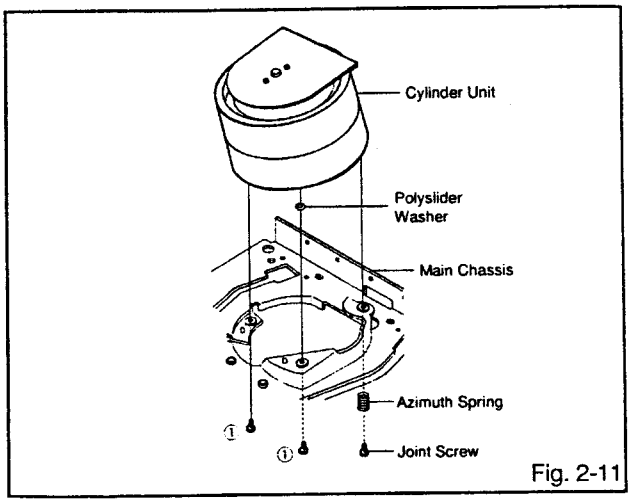


Fig. 2-11

2-12: PLATE BOTTOM (Refer to Fig. 2-12)

1. Remove the Capstan Belt.
2. Remove the 2 screws ①.
3. Remove the 3 screws ②.
4. Remove the Tension Lever Spring.
5. Remove the Plate Bottom.
6. Remove the Rotary Switch.

NOTE

When installing the Rotary SW, align the timing position.

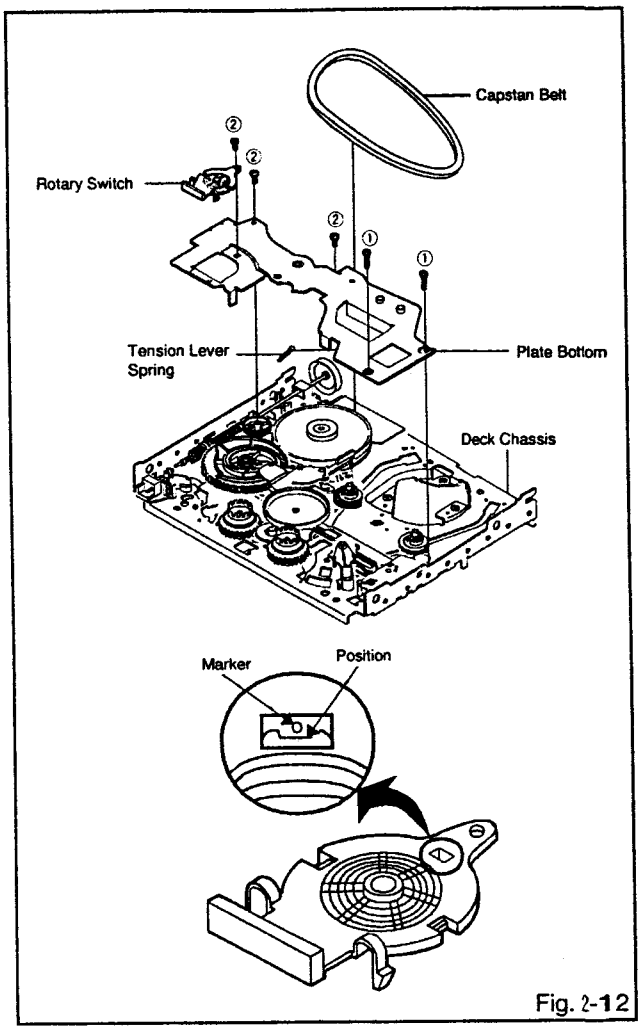


Fig. 2-12

2-13: CENTER PULLEY (Refer to Fig. 2-13)

1. Remove the polyslider washer ①.
2. Remove the Center Pulley.
3. Remove the polyslider washer ②.
4. Remove the Center Pulley Spring.
5. Remove the Idler Arm Ass'y.
6. Remove the 2 polyslider washers ③.
7. Remove the Clutch Gear T Ass'y and Clutch Gear S Ass'y.

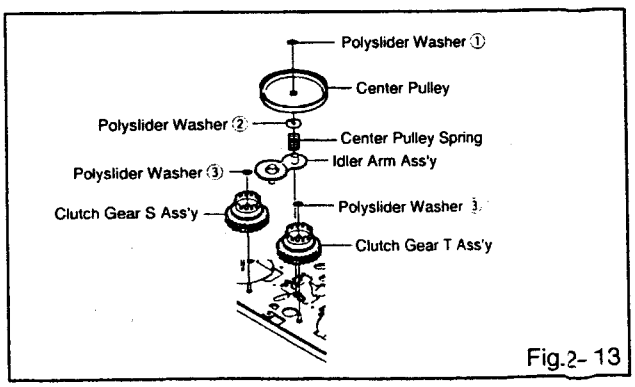


Fig. 2-13

DISASSEMBLY INSTRUCTIONS

2-14: MAIN CAM (Refer to Fig. 2-14)

1. Remove the Loading Lever.
2. Remove the Main Brake Lever.
3. Remove the Capstan Brake Spring.
4. Remove the Capstan Brake Ass'y.
5. Remove the Main Rod Spring.
6. Remove the Tension Holder.
7. Remove the Tension Lever Spring.
8. Remove the Tension Lever.
9. Remove the Main Cam.
10. Remove the Middle Gear.
11. Remove the Main Rod Ass'y.

NOTES

1. When installing the Main Rod ASS'Y, install side (B) first, then install side (A).
2. When installing the Loading Lever, align the timing marks.

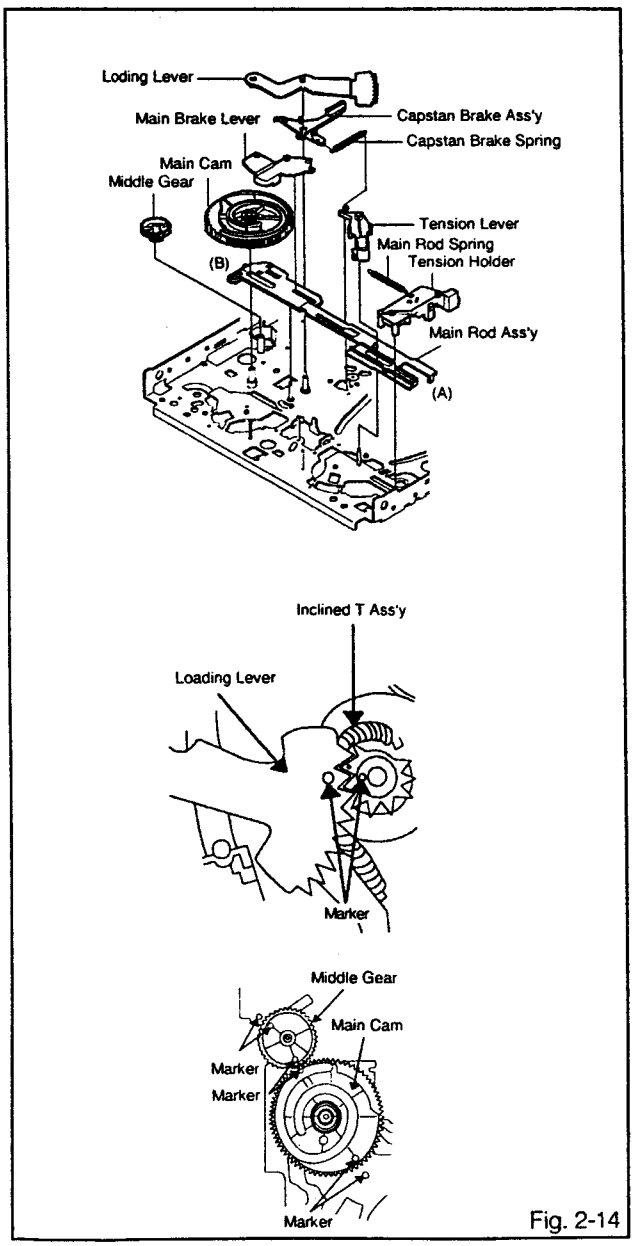


Fig. 2-14

2-15:CAPSTAN DD UNIT(Refer to Fig. 2-15)

1. Remove the Capstan Motor Belt.
2. Remove the screw ①.
3. Disconnect the CX4003 9 pins.
4. Remove the screw ②.
5. Remove the Deck Relay PCB.
6. Remove the 3 screws ③.
7. Remove the Capstan DD Unit.

NOTE

Use the specified screw to hold the Capstan DD Unit.

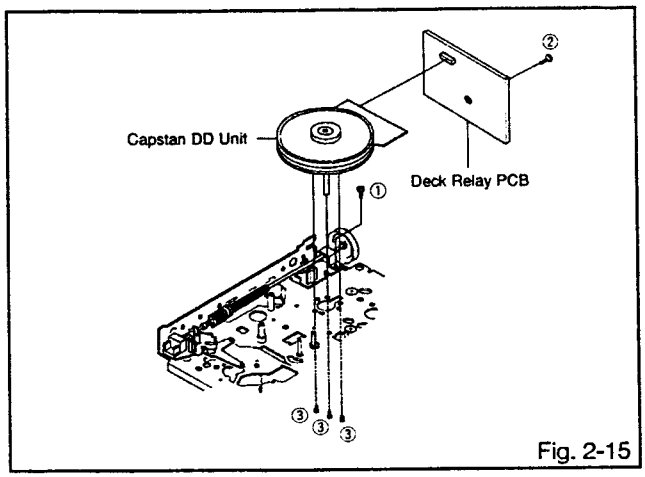


Fig. 2-15

2-16: INCLINED T ASS'Y, INCLINED S ASS'Y (Refer to Fig. 2-16)

1. Remove the 2 CS-Rings.
2. Remove the Inclined T Ass'y and Inclined S Ass'y.
3. Remove the Loading Gear T Ass'y.
4. Remove the Loading Gear S Ass'y.

NOTE

When installing the Inclined T ASS'Y and Inclined S ASS'Y, align the timing marks.

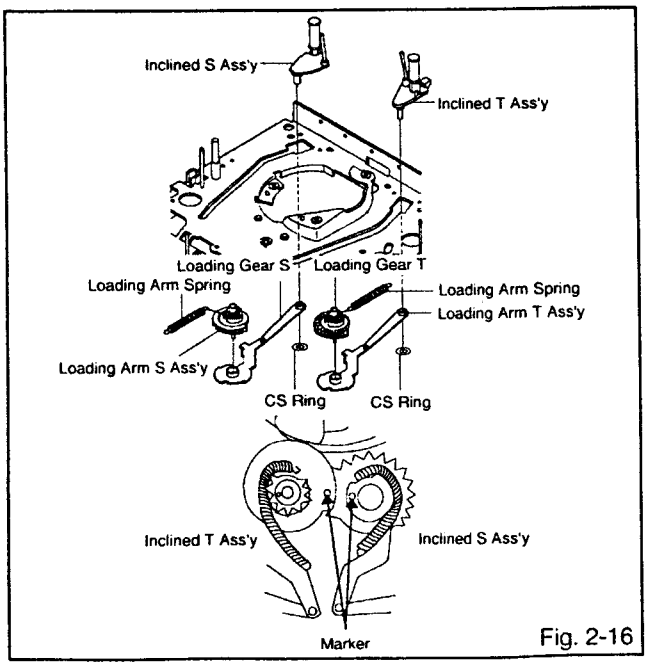


Fig. 2-16

KEY TO ABBREVIATIONS

A	A/C	:	Audio/Control
	ACC	:	Automatic Color Control
	AE	:	Audio Erase
	AFC	:	Automatic Frequency Control
	AFT	:	Automatic Fine Tuning
	AFT DET	:	Automatic Fine Tuning Detect
	AGC	:	Automatic Gain Control
	AMP	:	Amplifier
	ANT	:	Antenna
	A.PB	:	Audio Playback
	APC	:	Automatic Phase Control
	ASS'Y	:	Assembly
	AT	:	All Time
	AUTO	:	Automatic
	A/V	:	Audio/Video
B	BGP	:	Burst Gate Pulse
	BOT	:	Beginning of Tape
	BPF	:	Bandpass Filter
	BRAKE SOL	:	Brake Solenoid
	BUFF	:	Buffer
	B/W	:	Black and White
C	C	:	Capacitance, Collector
	CASE	:	Cassette
	CAP	:	Capstan
	CARR	:	Carrier
	CH	:	Channel
	CLK	:	Clock
	CLOCK (SY-SE)	:	Clock (Syscon to Servo)
	COMB	:	Combination, Comb Filter
	CONV	:	Converter
	CPM	:	Capstan Motor
	CTL	:	Control
	CYL	:	Cylinder
	CYL-M	:	Cylinder-Motor
	CYL SENS	:	Cylinder-Sensor
D	DATA (SY-CE)	:	Data (Syscon to Servo)
	dB	:	Decibel
	DC	:	Direct Current
	DD Unit	:	Direct Drive Motor Unit
	DEMOD	:	Demodulator
	DET	:	Detector
	DEV	:	Deviation
E	E	:	Emitter
	EF	:	Emitter Follower
	EMPH	:	Emphasis
	ENC	:	Encoder
	ENV	:	Envelope
	EOT	:	End of Tape
	EQ	:	Equalizer
	EXT	:	External
F	F	:	Fuse
	FBC	:	Feed Back Clamp
	FE	:	Full Erase
	FF	:	Fast Forward, Flipflop
	FG	:	Frequency Generator
	FL SW	:	Front Loading Switch
	FM	:	Frequency Modulation
	FSC	:	Frequency Sub Carrier
	FWD	:	Forward
G	GEN	:	Generator
	GND	:	Ground
H	H.P.F	:	High Pass Filter
	H.SW	:	Head Switch
	Hz	:	Hertz
I	IC	:	Integrated Circuit
	IF	:	Intermediate Frequency
	IND	:	Indicator
	INV	:	Inverter
K	KIL	:	Killer
L	L	:	Left
	LED	:	Light Emitting Diode
	LIMIT AMP	:	Limiter Amplifier
	LM, LDM	:	Loading Motor
	LP	:	Long Play
	L.P.F	:	Low Pass Filter
	LUMI.	:	Luminance
M	M	:	Motor
	MAX	:	Maximum
	MINI	:	Minimum
	MIX	:	Mixer, mixing
	MM	:	Monostable Multivibrator
	MOD	:	Modulator, Modulation
	MPX	:	Multiplexer, Multiplex
	MS SW	:	Mech State Switch
N	NC	:	Non Connection
	NR	:	Noise Reduction
O	OSC	:	Oscillator
	OPE	:	Operation
P	PB	:	Playback
	PB CTL	:	Playback Control
	PB-C	:	Playback-Chrominance
	PB-Y	:	Playback-Luminance
	PCB	:	Printed Circuit Board
	P. CON	:	Power Control
	PD	:	Phase Detector
	PG	:	Pulse Generator
	P-P	:	Peak-to Peak
R	R	:	Right
	REC	:	Recording
	REC-C	:	Recording-Chrominance
	REC-Y	:	Recording-Luminance
	REEL BRK	:	Reel Brake
	REEL S	:	Reel Sensor
	REF	:	Reference
	REG	:	Regulated, Regulator
	REW	:	Rewind
	REV, RVS	:	Reverse
	RF	:	Radio Frequency
	RMC	:	Remote Control
	RY	:	Relay
S	S. CLK	:	Serial Clock
	S. COM	:	Sensor Common
	S. DATA	:	Serial Data
	SEG	:	Segment
	SEL	:	Select, Selector
	SENS	:	Sensor
	SER	:	Search Mode
	SI	:	Serial Input
	SIF	:	Sound Intermediate Frequency
	SO	:	Serial Output
	SOL	:	Solenoid
	SP	:	Standard Play
	STB	:	Serial Strobe
	SW	:	Switch

KEY TO ABBREVIATIONS

S	SYNC	:	Synchronization
	SYNC SEP	:	Sync Separator, Separation
T	TR	:	Transistor
	TRAC	:	Tracking
	TRICK PB	:	Trick Playback
	TP	:	Test Point
U	UNREG	:	Unregulated
V	V	:	Volt
	VCO	:	Voltage Controlled Oscillator
	VIF	:	Video Intermediate Frequency
	VP	:	Vertical Pulse, Voltage Display
	V.PB	:	Video Playback
	VR	:	Variable Resistor
	V.REC	:	Video Recording
	VSF	:	Visual Search Fast Foward
	VSR	:	Visual Search Rewind
	VSS	:	Voltage Super Source
	V-SYNC	:	Vertical-Synchronization
	VT	:	Voltage Tuning
X	X'TAL	:	Crystal
Y	Y/C		Luminance/Chrominance

PREVENTIVE CHECKS AND SERVICE INTERVALS

The following standard table depends on environmental conditions and usage. Unless maintenance is properly carried out, the following service intervals may be quite shortened as harmful effects may be had on other parts. Also, long term storage or misuse may cause transformation and aging of rubber parts.

Time / Parts Name	500 hours	1,000 hours	1,500 hours	2,000 hours	3,000 hours	Notes
Audio Control Head	■	■	■	■	■	Clean those parts in contact with the tape.
Full Erase Head	■	■	■	■	■	
Roding Motor Belt		■		●		Clean the rubber, and parts whitch the rubber touches.
Reel Belt		■		●		
Pinch Roller	■	■	■	■	■ ●	
Capstan DD Unit					●	
Loading Motor					●	
Tension Band					●	
Capstan Shaft	■	■	■	■	■	
Tape Running Guide Post	■	■	■	■	■	Replace when rolling becomes abnormal.
Cylinder Unit	■	■ ●	■	■ ●	■ ●	Clean the Head.

● : Replace ■ : Clean

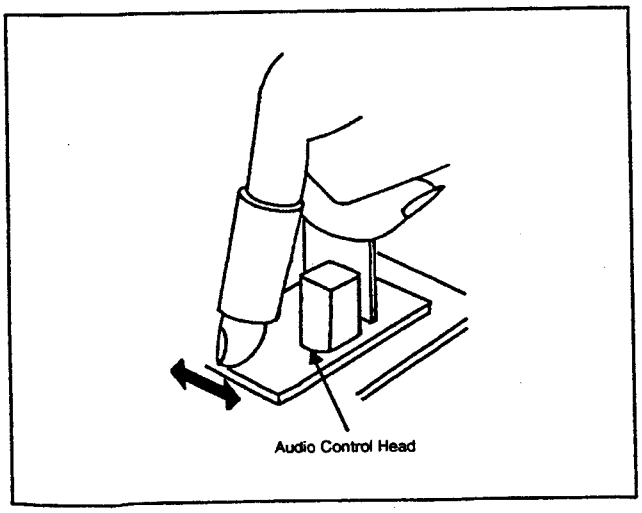
CLEANING

NOTE

- After cleaning the heads with isopropyl alcohol, do not run a tape until the heads dry completely. If the heads are not completely dry and alcohol gets on the tape, damage may occur.

1. AUDIO CONTROL HEAD

- Wrap a piece of chamois around your finger. Dip it in isopropyl alcohol and clean the audio control head by wiping it horizontally. Clean the full erase head in the same manner. **(Refer to the figure below)**



2. TAPE RUNNING SYSTEM

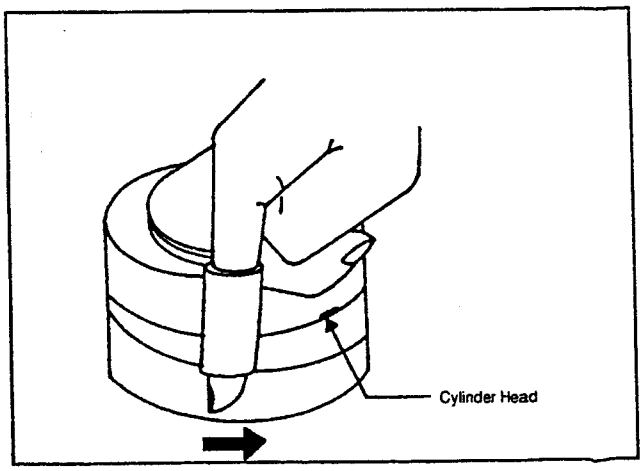
- When cleaning the tape transport system, use the gauze moistened with isopropyl alcohol.

3. CYLINDER

- Wrap a piece of chamois around your finger. Dip it in isopropyl alcohol. Hold it to the cylinder head softly. Turn the cylinder head counterclockwise to clean it (in the direction of the arrow). **(Refer to the figure below)**

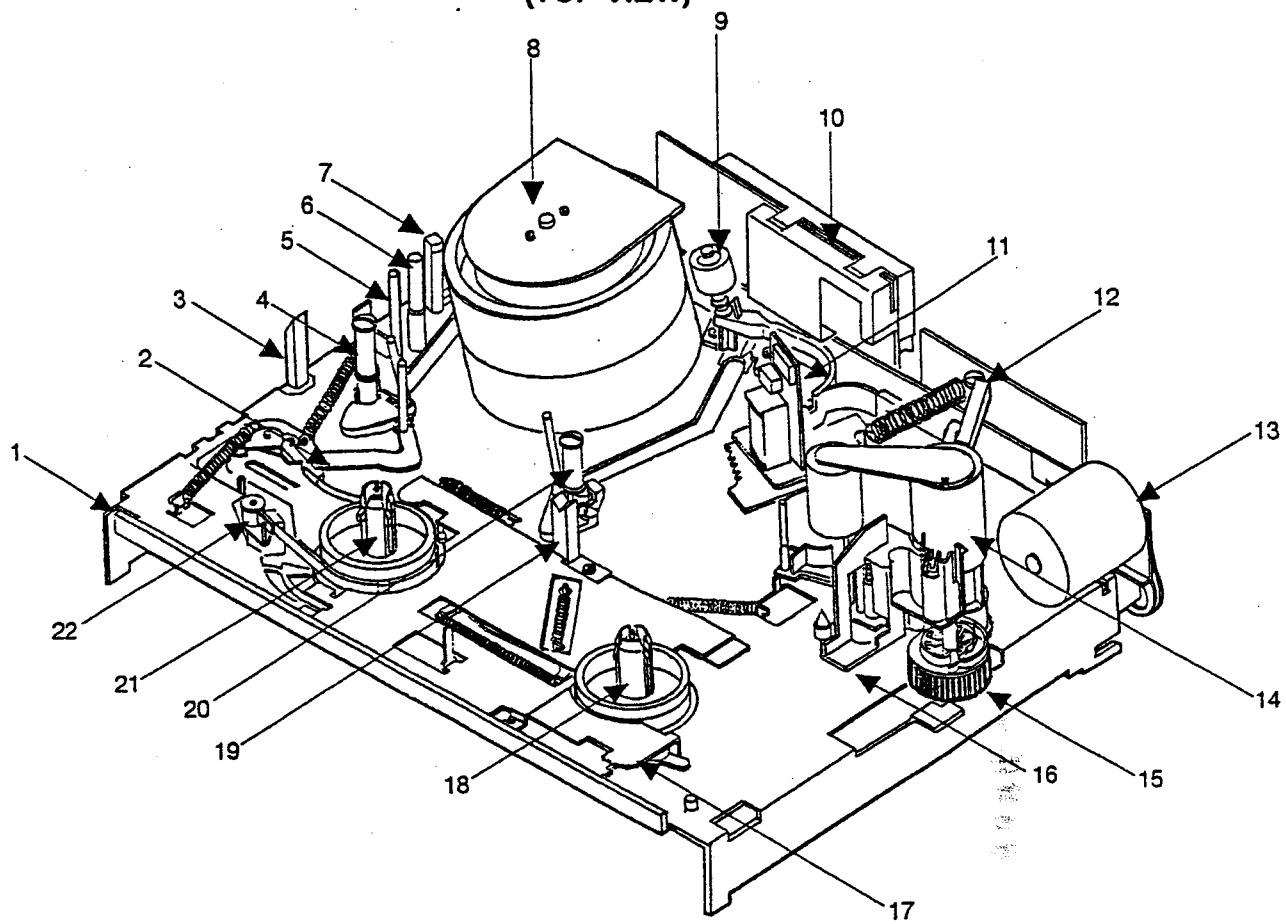
NOTE

Do not exert force against the cylinder head. Do not move the chamois up or down since this can damage the head. Always use a piece of chamois for cleaning.



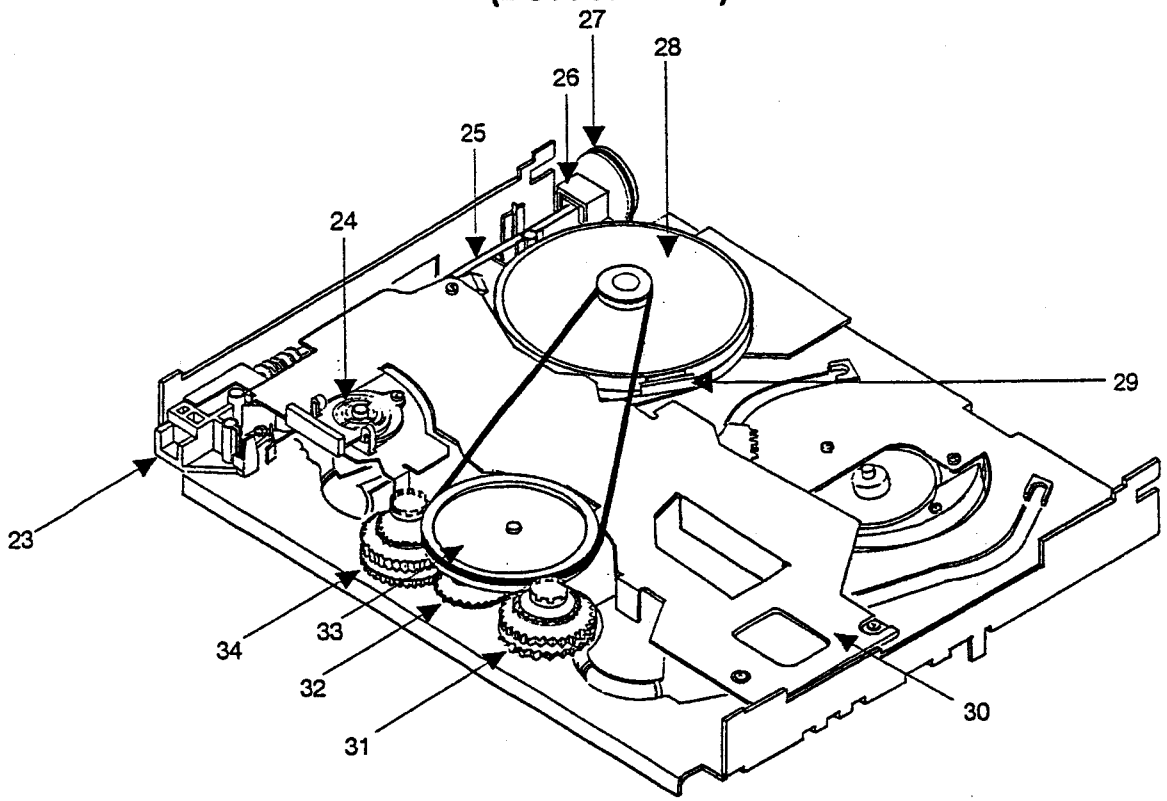
DECK PARTS LOCATIONS

(TOP VIEW)



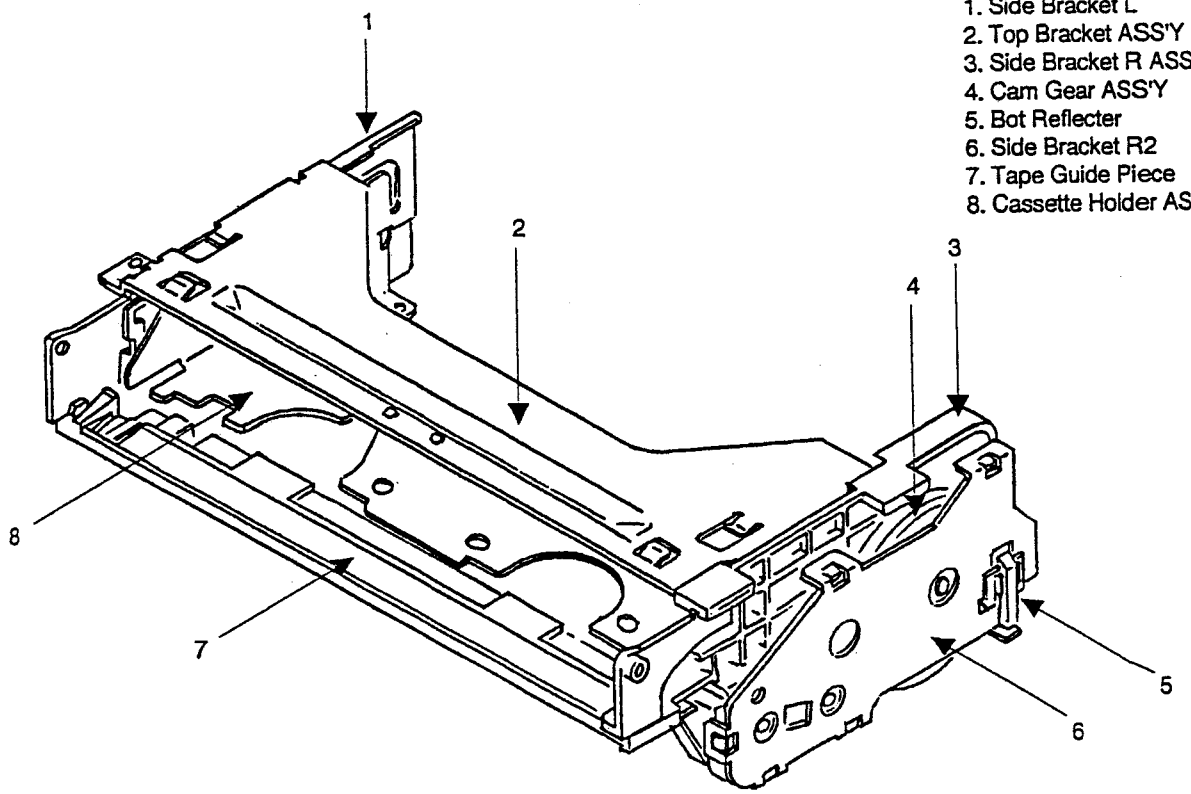
1. Main Chassis
2. Tension Arm ASS'Y
3. EOT Reflector
4. Guide Roller S ASS'Y
5. P0 Post
6. P1 Post
7. FE Head
8. Cylinder Unit
9. Auto Head Cleaning
10. Head Amp PCB
11. Audio/Control Head
12. Deck Relay PCB
13. Loading Motor
14. Pinch Roller Block
15. Cam Gear
16. Cassette Opener
17. Brake Bracket
18. Reel
19. LED Reflector
20. Guide Roller T ASS'Y
21. Reel
22. Tension Band ASS'Y

DECK PARTS LOCATIONS
(BOTTOM VIEW)



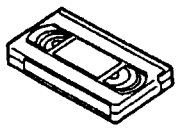
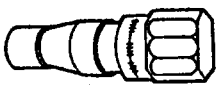
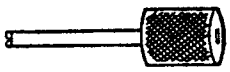
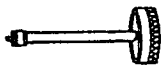
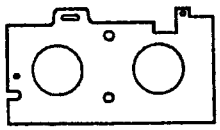
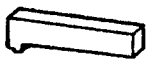
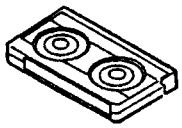
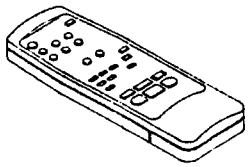
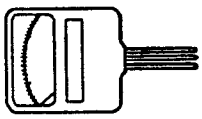
23. Worm Bracket F ASS'Y
24. Mecha State SW
25. Worm ASS'Y
26. Worm Bracket R ASS'Y
27. Loading Motor Belt
28. Capstan DD Unit
29. Capstan Brake ASS'Y
30. Bottom Plate
31. Clutch Gear S ASS'Y
32. Idler Arm ASS'Y
33. Center Pully
34. Clutch Gear T ASS'Y

(FRONT LOADING UNIT)



1. Side Bracket L
2. Top Bracket ASS'Y
3. Side Bracket R ASS'Y
4. Cam Gear ASS'Y
5. Bot Reflecter
6. Side Bracket R2
7. Tape Guide Piece
8. Cassette Holder ASS'Y

SERVICING FIXTURES AND TOOLS

VHS Alignment Tape JG001E (VP1S-LI6^3) JG001F (VP1S-C01^3) 	JG002B Adapter JG002F Dial Torque Gauge (60~600gr/cm) JG002G (100~1200gr/cm) 	JG005 Post Adjustment Screwdriver 	JG153 X Value Adjustment Screwdriver 
JG022 Master Plane 	JG024 Reel Disk Height Adjustment Jig 	JG100A Torque Tape (VHT-063) 	JG155 Remote Control 
Tentelometer 			

SERVICING FIXTURES AND TOOLS

Part No.	Remarks
JG001E	Monoscope, 6KHz
JG001F	Color Bar, 1KHz,
JG002F	Playback Take Up Torque
JG002G	Fast Forward Torque, Rewind Torque, Brake Torque(Take up Reel/Supply Reel)
JG005	Guide Roller Adjustment
JG153	X-Value Adjustment
JG022/JG024	Reel Disk Height Adjustment
JG100A	Playback Back Tension Torque
JG155	Used to PG SHIFTER Adjustment

PREPARATION FOR SERVICING

1. Remove the Main PCB from the DECK Chassis.
2. If it is necessary, remove the Main PCB from the DECK Chassis.
3. Connect as shown in the below.
   - O Connect the Main PCB to the Mecha State SW(SW101).
   - O Connect the Main PCB to the Deck Relay PCB.
   - O Connect the Main PCB to the Head Amp PCB.
4. Short circuit between TP1010 and TP1011.
   (Refer to MAJOR COMPONENT LOCATION GUIDE)
5. At that time, the STOP/EJECT button is available to insert and eject the Cassette Tape.

MECHANICAL ADJUSTMENTS

1. CONFIRMATION AND ADJUSTMENT

Read the following NOTED items before starting work.

* Place an object which weighs between 350g and 500g on the Cassette Tape to keep it steady when you want to make the tape run without the front loading unit. (Do not place an object which weighs over 500g.)
* When you activate the deck without the front loading unit, short circuit between **TP1010** and **TP1011**. In this condition the BOT/EOT sensor will not function.

1-1: CONFIRMATION AND ADJUSTMENT OF REEL DISK HEIGHT

1. Turn on the power and set to the STOP mode.
2. Set the master plane **(JG022)** and reel disk height adjustment jig **(JG024)** on mechanism framework, taking care not to scratch the drum, as shown in **Fig. 1-1-A.**
3. Confirm that the reel disk is lower than "A" of the reel disk height adjustment jig **(JG024)** on the master plane and higher than "B" as shown in **Fig. 1-1-B.** If it is not, adjust to less than 7.5mm±0.2mm with the height adjustment washer.
4. Perform the same adjustment for other reel.

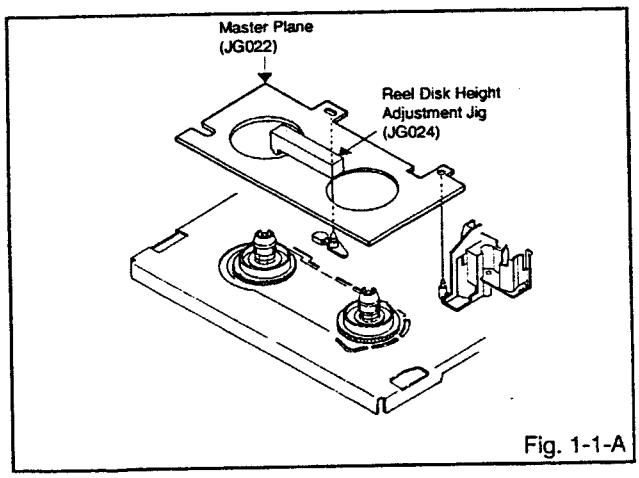


Fig. 1-1-A

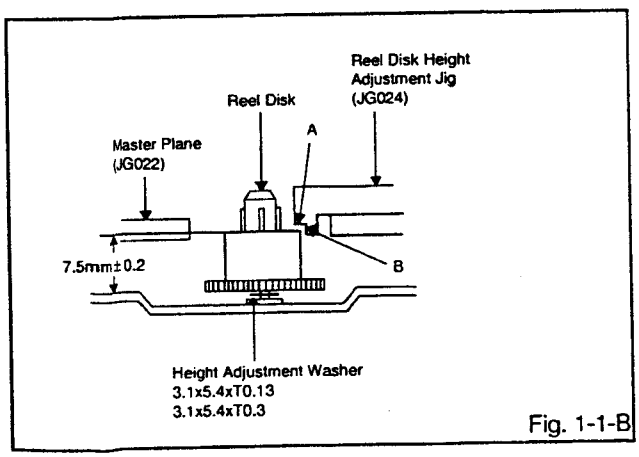


Fig. 1-1-B

1-2: CONFIRMATION AND ADJUSTMENT OF TENSION POST POSITION

1. Turn on the power and set to the PLAY mode adjust the Tension Adjust so that the Tension Post is at the position of 0.3mm~0.5mm from the Rib. **(Refer to Fig. 1-2)**
2. Confirm that the video tape is not curling at the flange of P1 post or is not running on flanges.

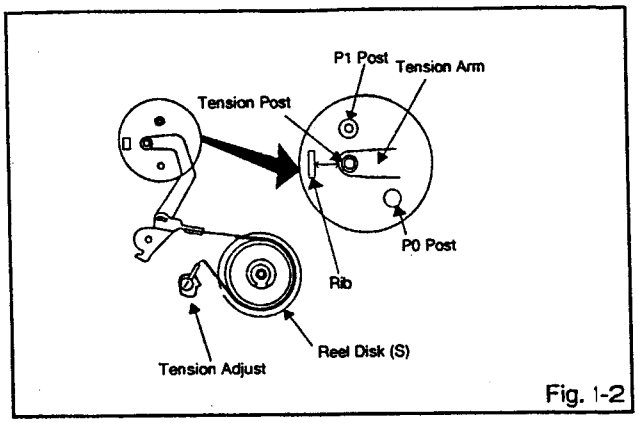


Fig. 1-2

1-3: CONFIRMATION AND ADJUSTMENT OF BACK TENSION ON PLAYBACK

1. Load a video tape recorded in standard speed mode. Set the unit to the PLAY mode.
2. Install the tentelometer as shown in **Fig. 1-3.** Confirm the value is within 20~27gr/cm at this time.

※ IN CASE OF USING A CASSETTE TYPE TORQUE TAPE.

1. After adjustment, confirm and adjust the tension post position **(Refer to item 1-2)** for the tension arm, install the cassette type torque tape **(JG100A)** and set to the PLAY mode.
2. Confirm that the left hand side tension value of the torque tape is 25~38gr/cm for the standard mode tape.

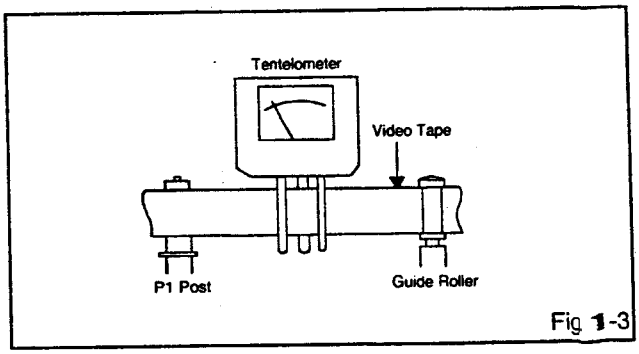


Fig. 1-3

MECHANICAL ADJUSTMENTS

1-4: CONFIRMATION OF FAST FORWARD TORQUE

1. Set torque gauge **(JG002G)** on take-up reel disk, and place unit in FAST FORWARD mode. **(Refer to Fig. 1-4)**
2. Confirm that torque is more than 400gf/cm.

NOTE

After setting the torque gauge on the reel disk, hold the gauge in place.
Push the FAST FORWARD button and the reel disk will begin to turn.

1-5: CONFIRMATION OF REWIND TORQUE

1. Operate within 4 or 5 seconds after the reel disk begins to turn.
2. Set torque gauge **(JG002G)** on supply reel disk, and place the unit in REWIND mode. **(Refer to Fig 1-4)**.
3. Confirm that torque is more than 400gf/cm.

NOTE

After setting the torque gauge on the reel disk, hold the gauge in place.
Push the REWIND button and the reel disk will begin to turn.

1-6: CONFIRMATION OF REEL BRAKE TORQUE

(Take-Up Reel Brake) **(Refer to Fig. 1-4)**

1. Set to STOP mode.
2. Set the torque gauge **(JG002G)** to the take-up reel and turn it counterclockwise.
3. Confirm that it is than 200gf/cm at that time.

(Supply Reel Brake) **(Refer to Fig. 1-4)**

1. Set to STOP mode.
2. Set the torque gauge **(JG002G)** to the supply reel and turn it clockwise.
3. Confirm that it is more than 200gf/cm at that time.

NOTE

Separate the idler from the reel and confirm the brake torque.

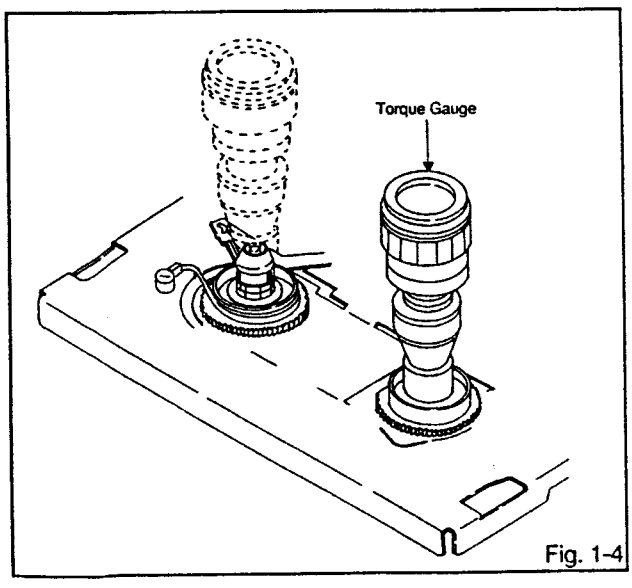


Fig. 1-4

NOTE

If the torque value checked is out of tolerance, replace the appropriate parts as follows.

Check Items	Replace Parts
1-4	Idler Ass'y or Clutch ASS'Y
1-5	Idler Ass'y or Clutch ASS'Y
1-6	Main Brake T Ass'y or Main Brake S Ass'y

2. TAPE RUNNING CONFIRMATION AND ADJUSTMENT

Tape running is adjusted precisely at the factory. Normally, it is not necessary to make adjustments. It is necessary to confirm and make adjustments when the parts of the tape running mechanism are replaced because of extensive usage or failure.

2-1: GUIDE ROLLER

1. Connect CH-1 on the oscilloscope to **TP4001 (PB Envelope)** and CH-2 to **TP1003 (SW Pulse)**.
2. Set the tracking to manual center position in the following way. Hold and press the tracking auto button more than 2 seconds to set the tracking to center position.
3. Trigger with SW pulse and observe the envelope. **(Refer to Fig. 2-1-A)**
4. Adjust the guide roller height while observing the envelope, and make the envelope flat. Adjust the envelope so that the flatness will not be affected even when the tracking control button is pressed. (Use the adjustment screwdriver **JG005**).
5. Press and hold the tracking control button and (at the point that the envelope waveform starts to reduce) adjust the envelope so that the A : B ratio is better than 3 : 2. **(Refer to Fig. 2-1-B)**
6. Adjust the PG shifter **(ELECTRICAL ADJUSTMENTS : ITEM 3-1)** in the PLAY mode.

NOTE

After adjustment, confirm and adjust A/C head tilt. **(Refer to item 2-2)**

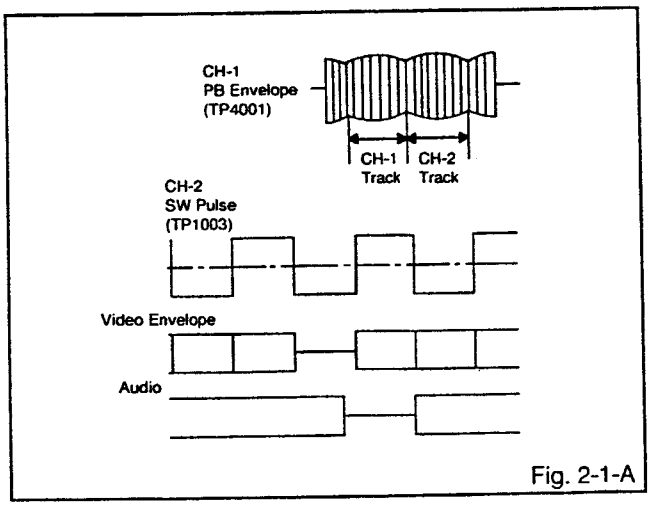


Fig. 2-1-A

MECHANICAL ADJUSTMENTS

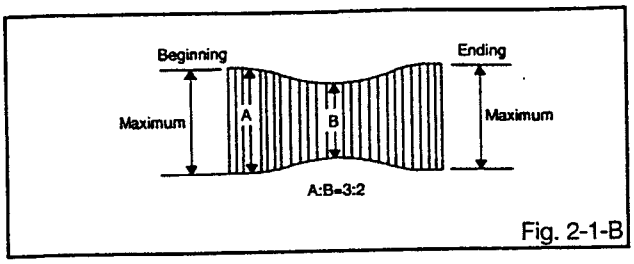


Fig. 2-1-B

2-2: CONFIRMATION AND ADJUSTMENT OF A/C HEAD TILT

When the tape is running abnormally, perform the following adjustments.

1. Insert a new tape and play it back.
2. Confirm that there is no crease on the tape between the P4 post and guide roller (R) and the tape is running smoothly. (It is absolutely impossible to get satisfactory sound if the tape is distorted between the A/C head and P4 post.)
3. If the tape still does not run smoothly, turn the screw ① and adjust the tilt of the A/C head. **(Refer to Fig. 2-2)**

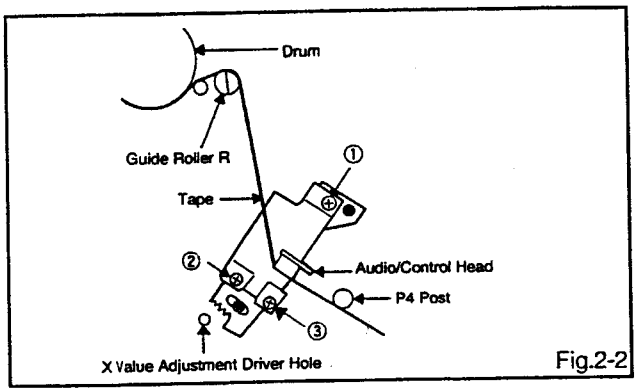


Fig.2-2

2-3: ADJUSTMENT OF A/C HEAD HEIGHT AND AZIMUTH

1. Playback a VHS alignment tape **(JG001E)** and observe the waveform at the audio output terminal.
2. Turn the screw ② slowly to change the azimuth of the A/C head. Adjust the height so that the audio output becomes maximum. **(Refer to Fig. 2-2)**
3. Adjust the screw ③, **(Refer to Fig. 2-2)** until the height of the A/C head reaches the position against the tape as shown in **Fig. 2-3.**
4. When the control head height is not fit. (When you must turn the screw more than 45 degrees), Turn all of the screws ①, ② and ③ to the same degrees. Then confirm the angle of the audio/control head and adjust again.

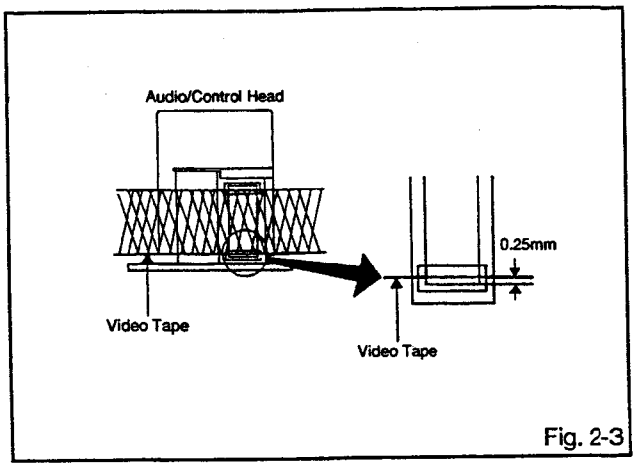
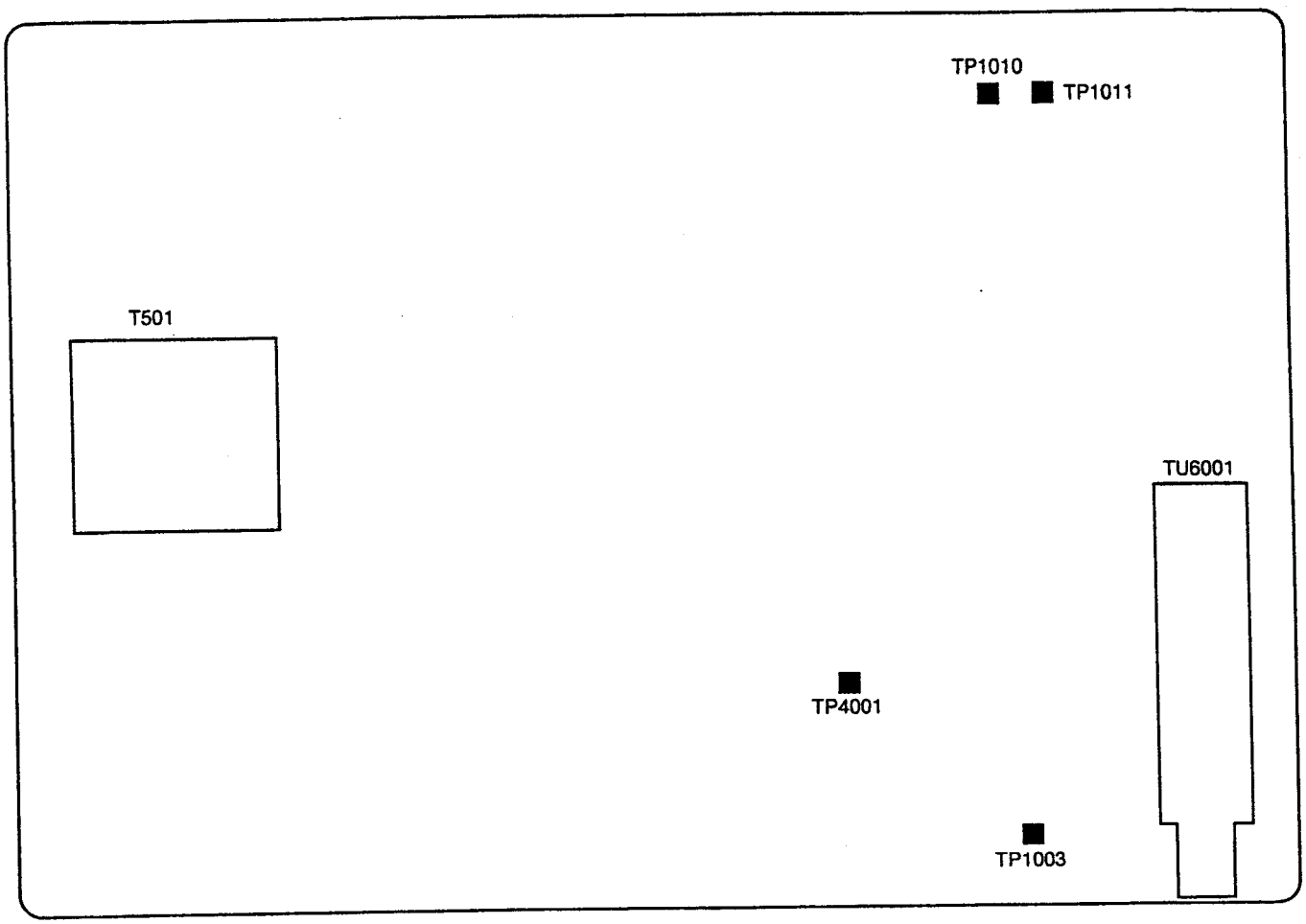


Fig. 2-3

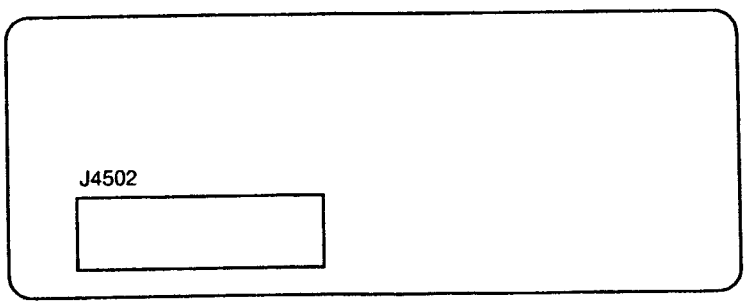
2-4: TAPE RUNNING ADJUSTMENT

1. Adjust the height of reel disk. **(Refer to item 1-1)**
2. Confirm and adjust tension post position. **(Refer to item 1-2)**
3. Adjust the guide roller. **(Refer to item 2-1)**
4. Adjust the A/C head tilt. **(Refer to item 2-2)**
5. Adjust the A/C head height and azimuth. **(Refer to item 2-3)**
6. Connect CH-1 on the oscilloscope to **TP4001** and CH-2 to **TP1003.** Playback the VHS alignment tape **(JG001E).** Set the tracking to manual center. Adjust X with the screw driver for X **(JG153)** as the **Fig. 2-1-A** and **Fig. 2-1-B. (Refer to No. 2 of the item 2-1).**

MAJOR COMPONENTS LOCATION GUIDE



MAIN



21 PIN

ELECTRICAL ADJUSTMENTS

3. ADJUSTMENT PROCEDURE

Read and perform these adjustments when repairing the circuits or replacing electrical parts or PCB assemblies.

CAUTION

When replacing IC's or transistors, use only specified silicon grease **(YG6260M)**.
(To prevent the damage to IC's and transistors.)

3-1: PG SHIFTER

CONDITIONS

MODE-PLAYBACK
Input Signal-Alignment Tape **(JG001F)**

INSTRUCTIONS

1. Connect CH-1 on the oscilloscope to **TP1003** and CH-2 to **J4502**.
2. Playback the alignment tape. **(JG001F)**
3. Press the PG AUTO key. **(JG103B)**
4. While the ATR indicator is flashing, press the PG MANU key. **(JG103B)**
5. Press the Tracking +/– key until the beginning of the switching pulse is 6.5 ± 0.5 as shown in the Fig. 3-1.
6. Press the Tracking Auto key.

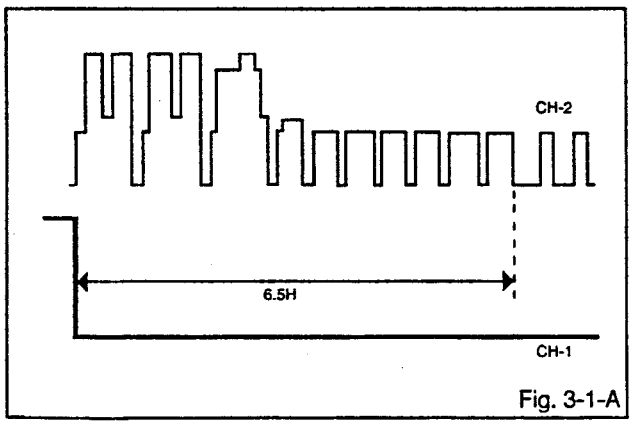


Fig. 3-1-A

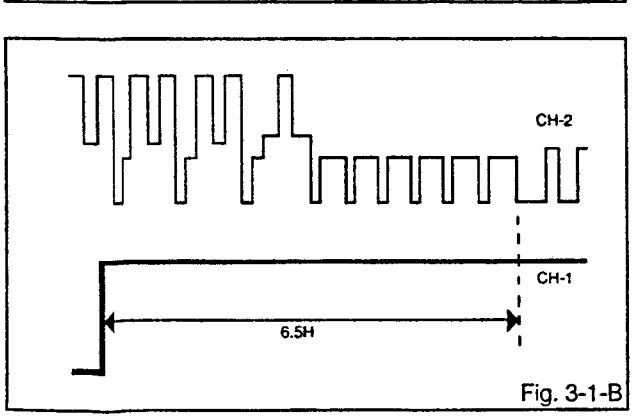
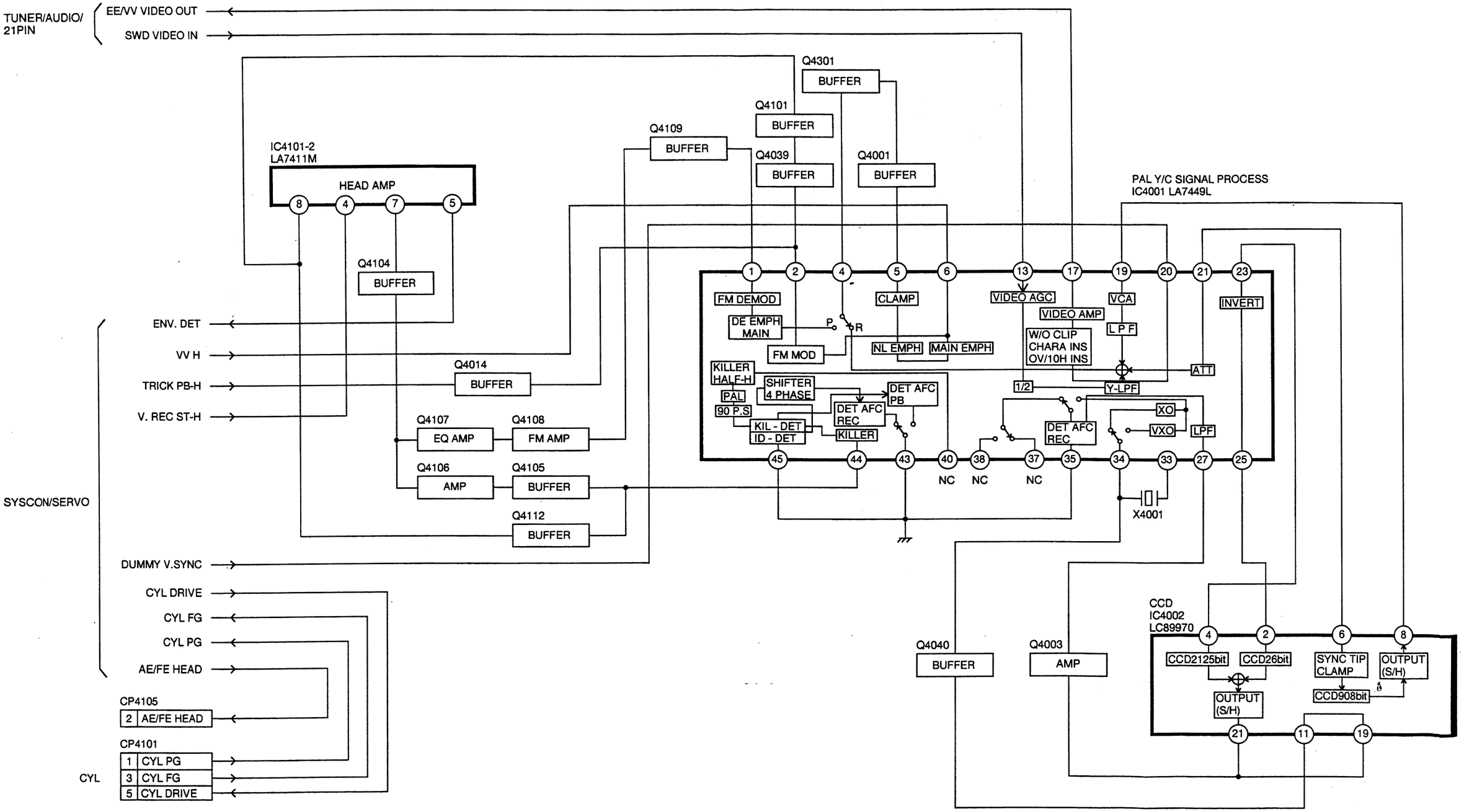


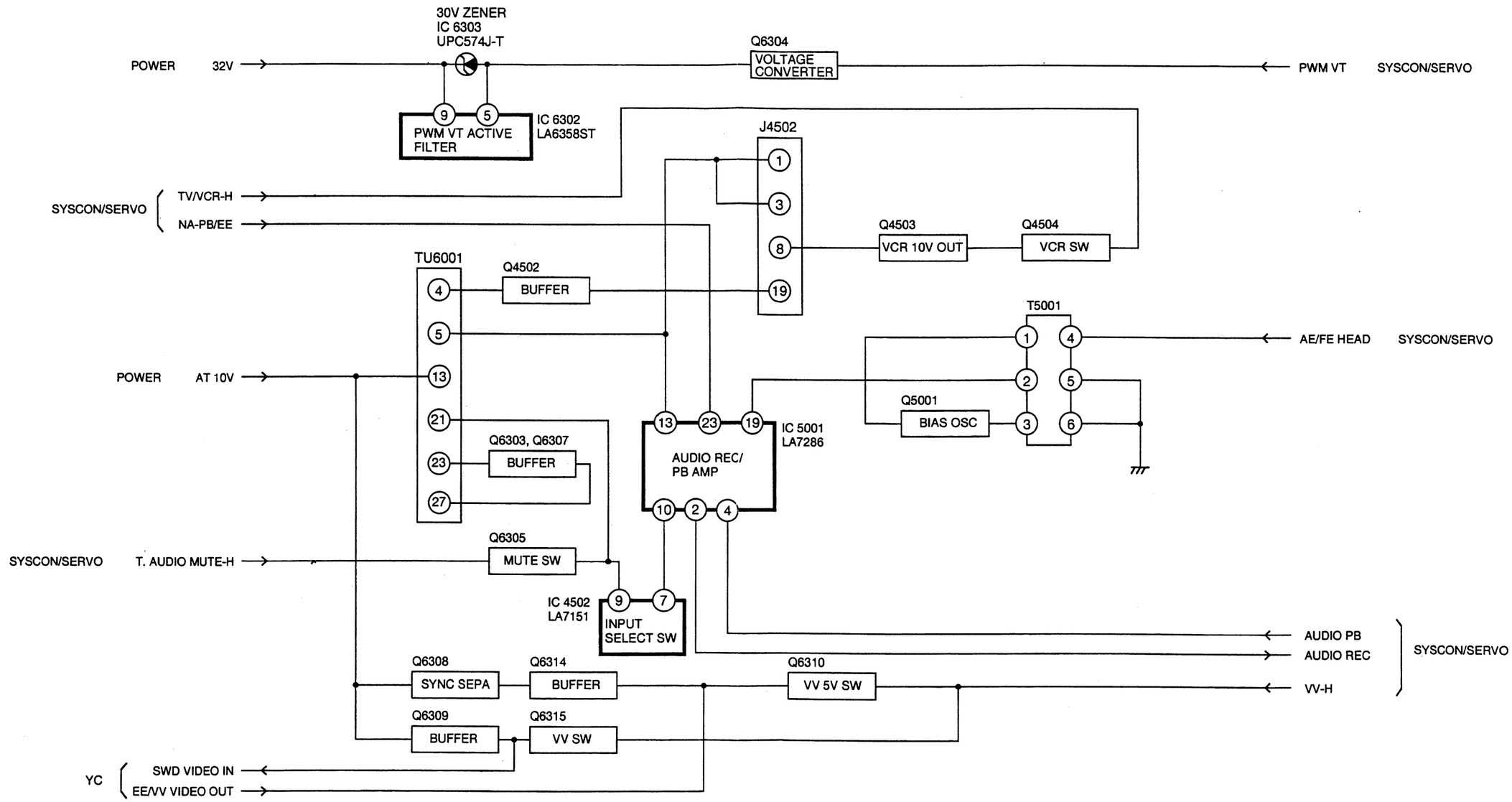
Fig. 3-1-B

Y.C./HEAD AMP BLOCK DIAGRAM



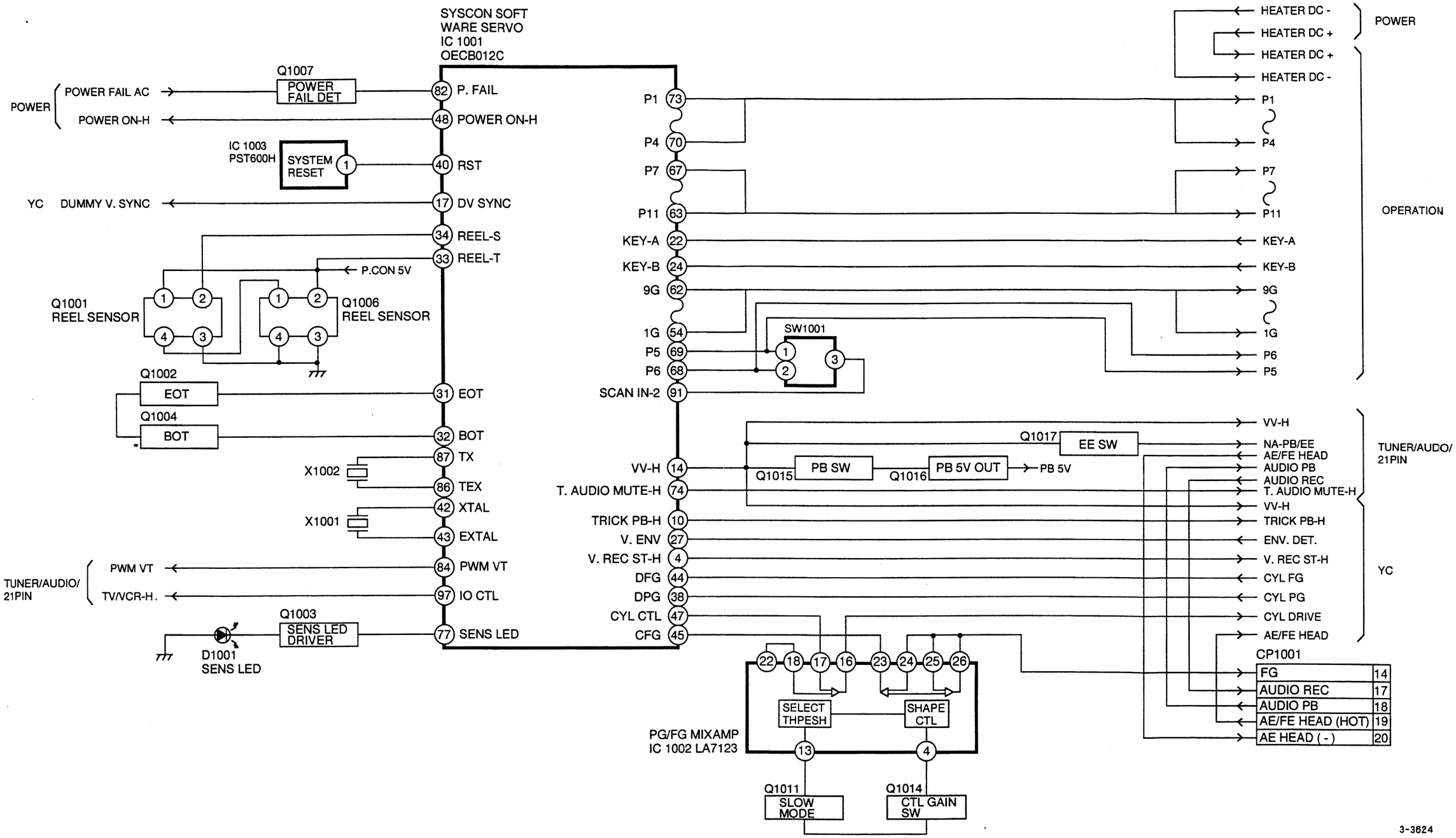
3-3623

TUNER/AUDIO/21PIN BLOCK DIAGRAM

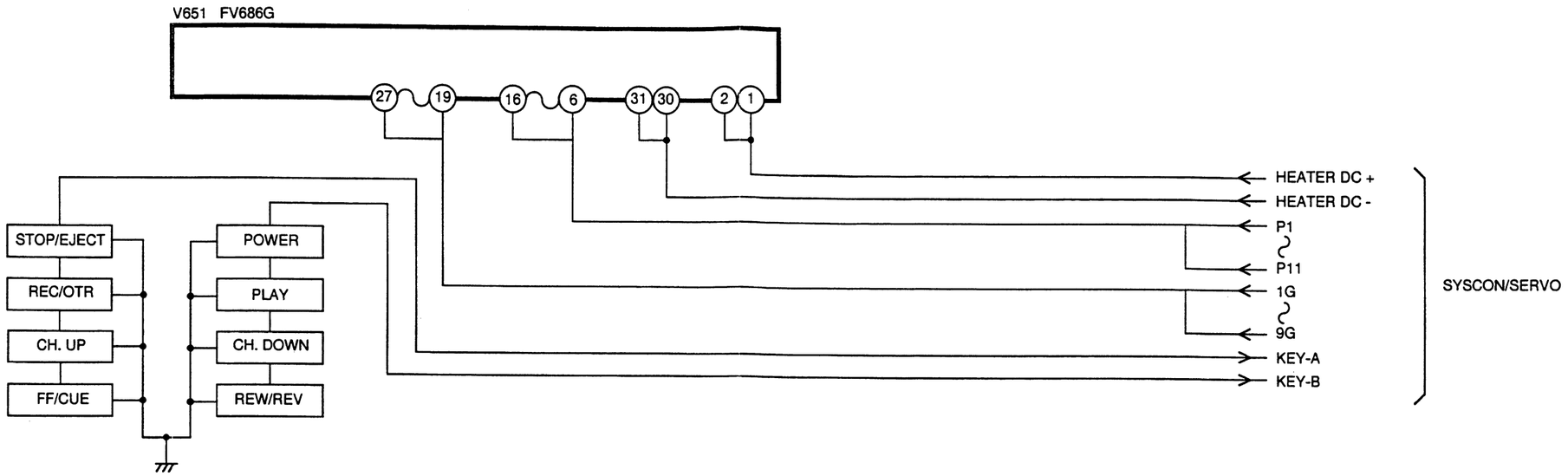


3-36[illegible]5

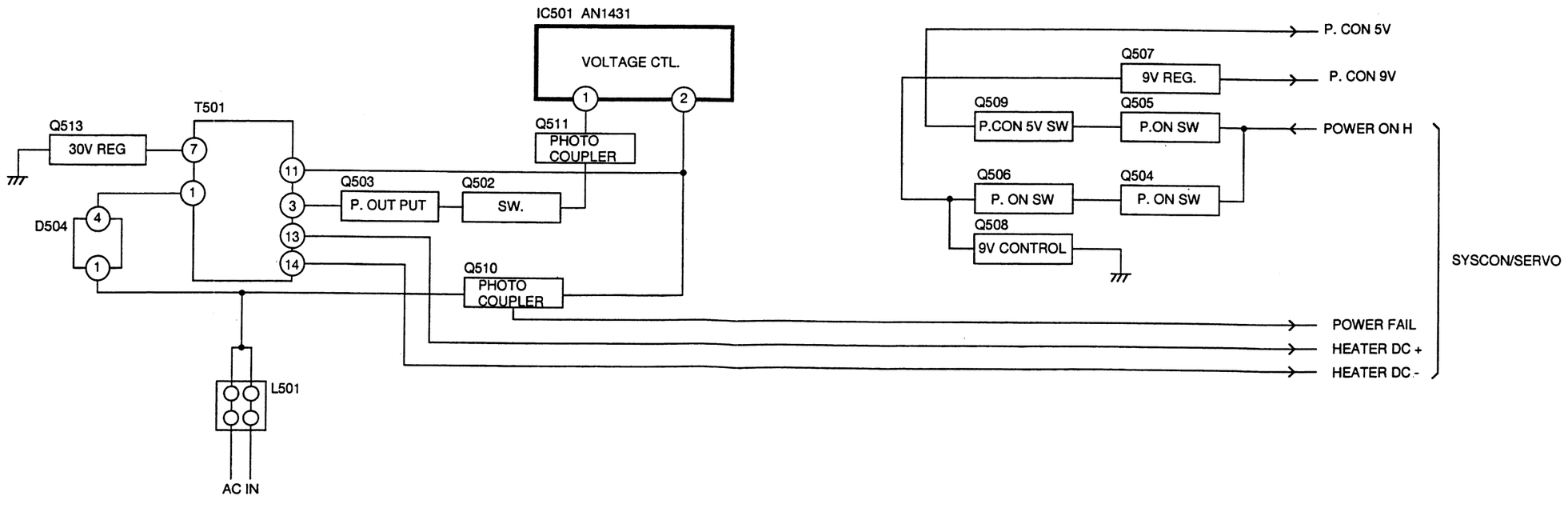
SYSTEM CONTROL/SERVO BLOCK DIAGRAM



OPERATION BLOCK DIAGRAM



POWER BLOCK DIAGRAM

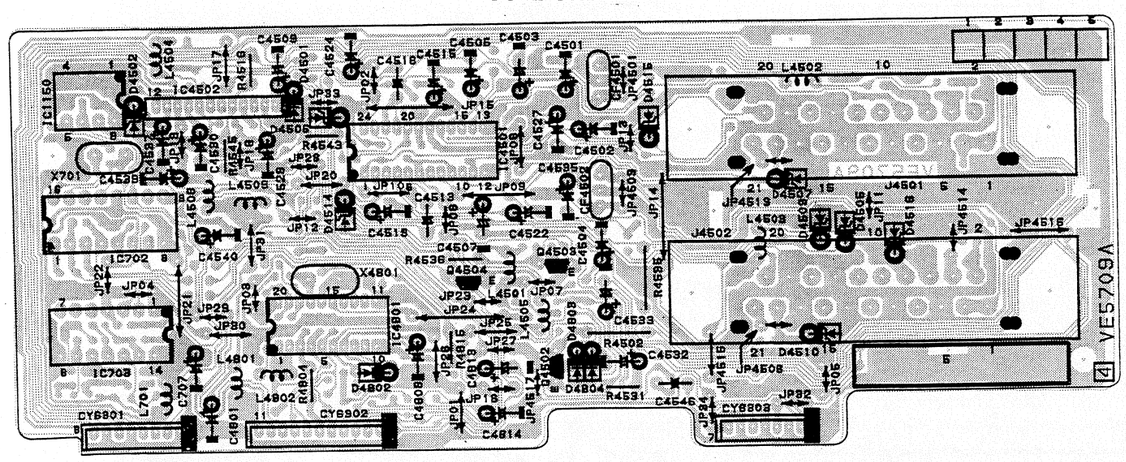


3-362

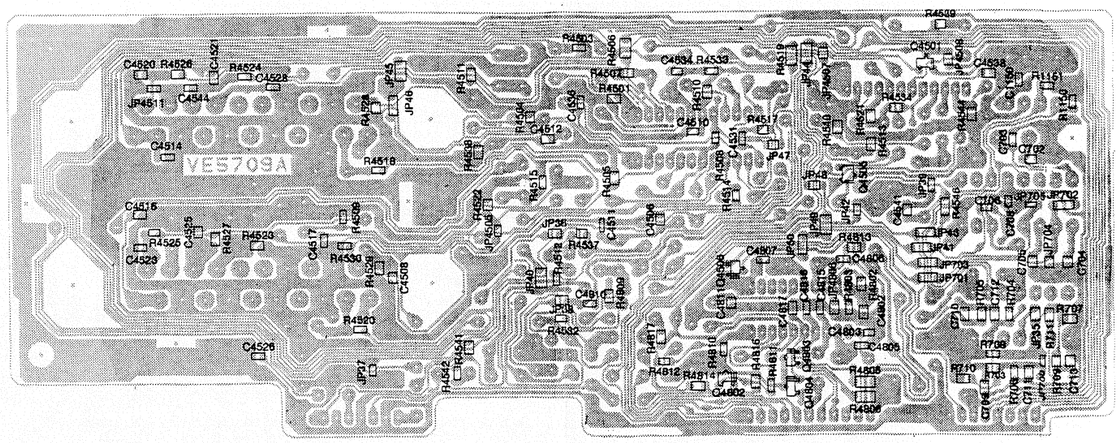
PRINTED CIRCUIT BOARDS

21PIN

COMPONENT SIDE

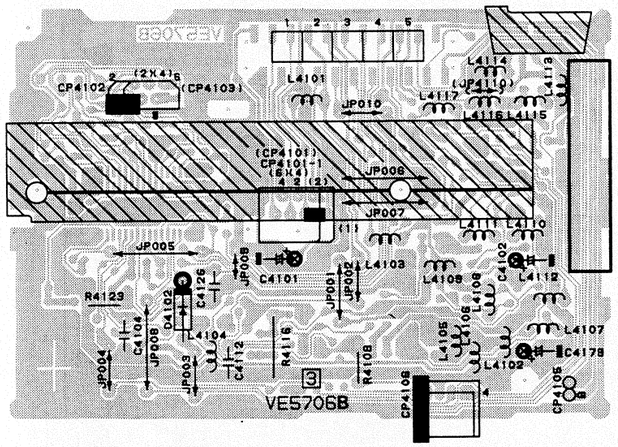


SOLDER SIDE



HEAD AMP

COMPONENT SIDE



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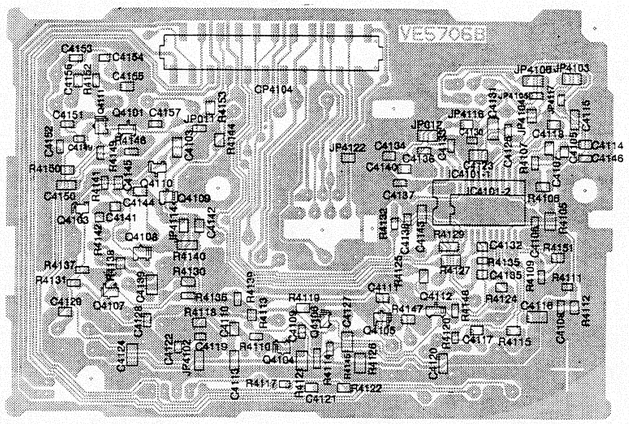
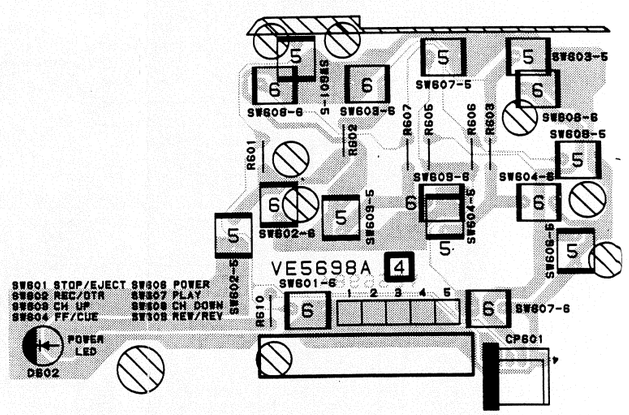
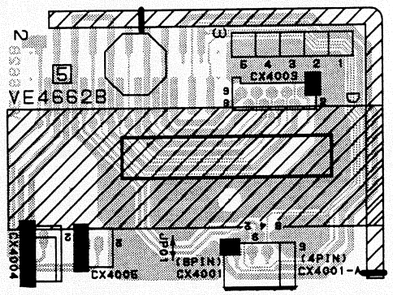


OPERATION

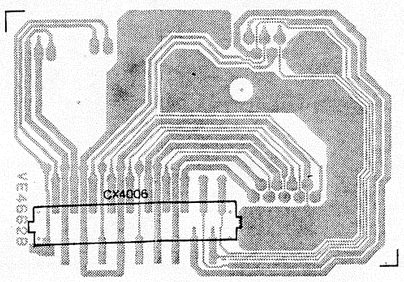


DECK RELAY

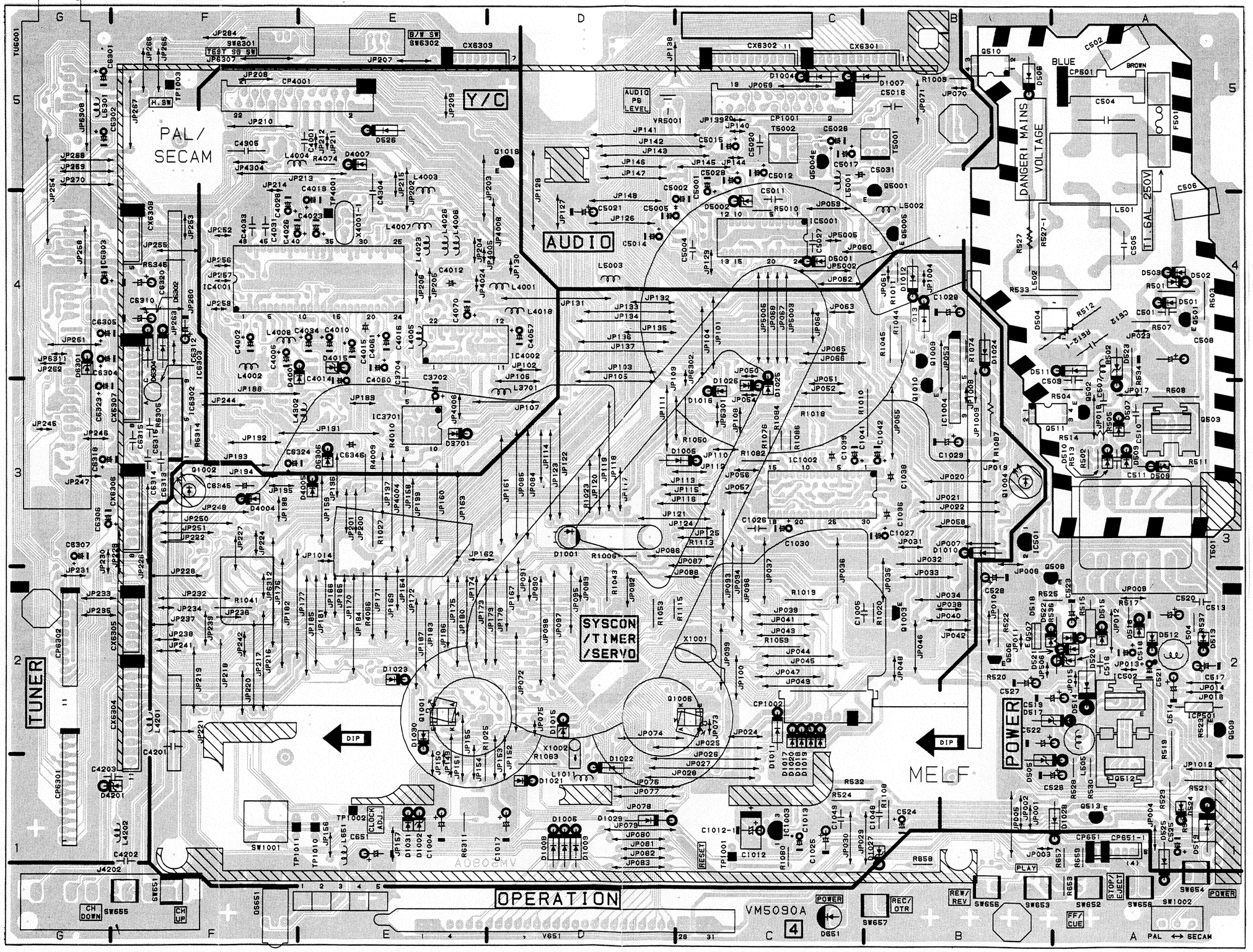
COMPONENT SIDE



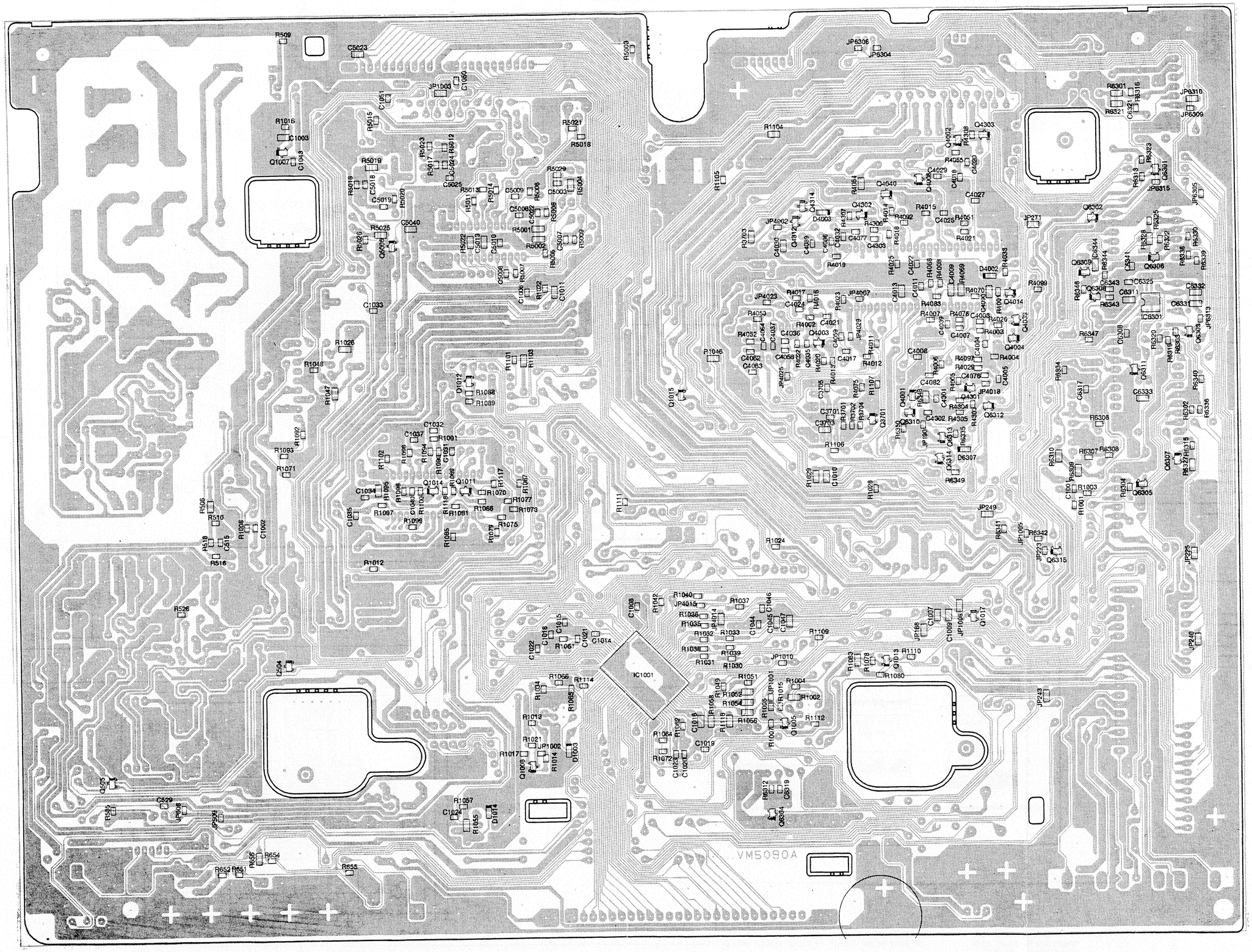
SOLDER SIDE



PRINTED CIRCUIT BOARDS
MAIN
COMPONENT SIDE



PRINTED CIRCUIT BOARDS
MAIN
SOLDER SIDE



Y.C. SCHEMATIC DIAGRAM

RF(M)TO HEAD AMP

C4001 CTL DRIVE, CTL GND, CTL FG, CTL +13.4V, CTL PG, GND, P.CON 5V, PB-C/REC-C, PB 5V, PB FM-Y, NC, H.SW, H.SYNC, V.REC ST-H, ENV.DET, NC, REC-Y, NC NC NC, FE HEAD (GND), FE HEAD (HOT)

FROM/TO POWER
P.CON+5V
GND

RF(M)TO TUNER/AUDIO
EE/VV_V.OUT
SWD_VIDEO_IN
(VIDEO-IN-GND) GND
(VIDEO-OUT-GND) GND
(FE-HEAD) GND

RF(M)TO SYSTER/SERVO
FE_HEAD(HOT)
V.REC_ST-H
ENV.DET
V.H.SW
DUMMY_V.SYNC
TRICK_PB-H
PB+5V
VV-H
SP/LP/EP
CYL_DRIVE
GND
CYL_FG
AT+13.4V
CYL_PG
GND

L4001 100uH 06-07
L4003 100uH 06-07
L4018 100uH

BUFFER Q4014 2SC2412K
BUFFER Q4039 2SC2412K
BUFFER Q4001 2SA1037K
BUFFER Q4301 2SC22412K
BUFFER Q4040 2SC2412K
AMP Q4003 2SC2412K

PAL Y/C SIGNAL PROCESS LA7491 (C4001)

CCD LS83370 (IC4002)

X4001 4.43361895 MHz

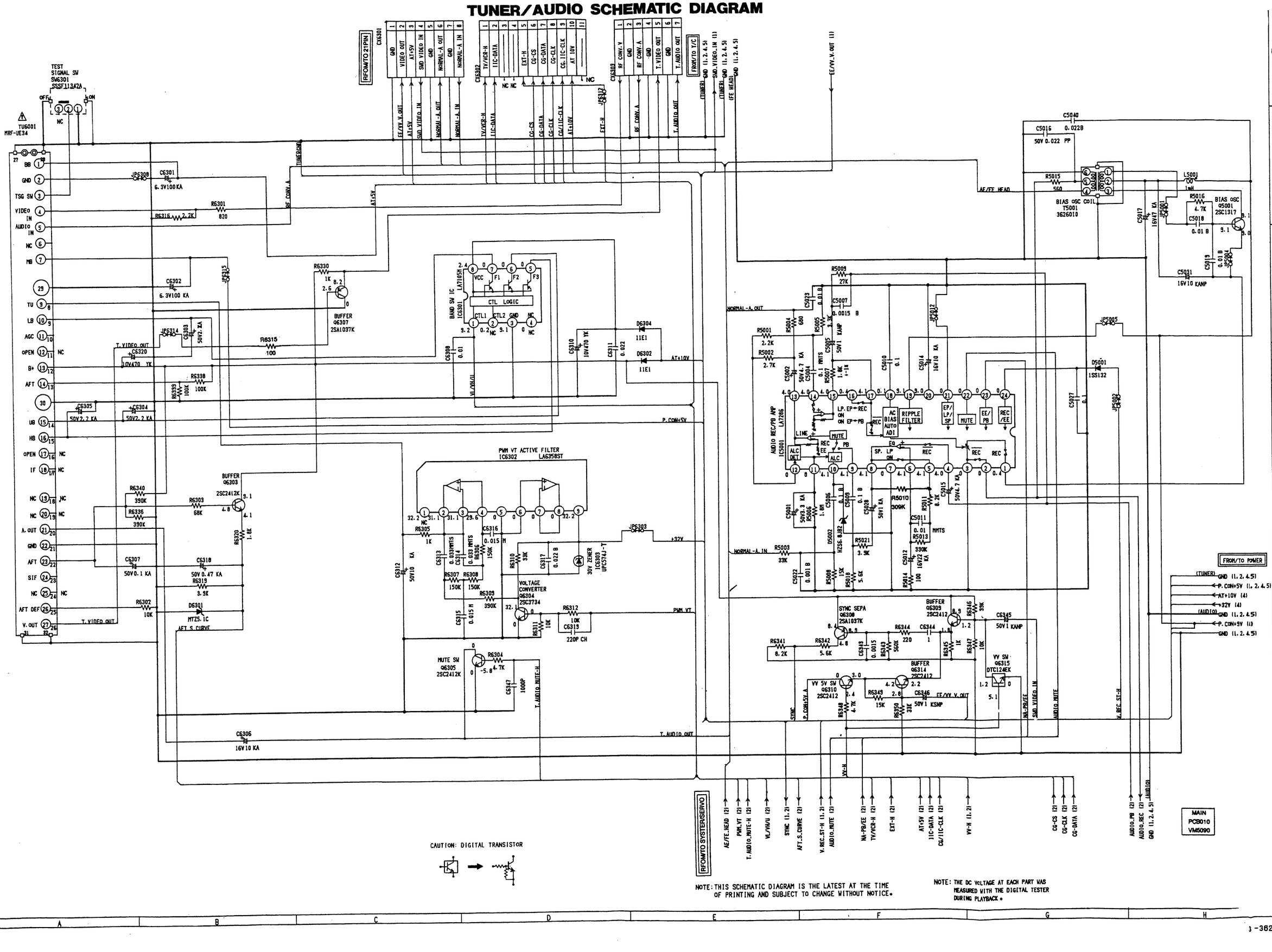
TP4001

IC4001 (3) REC 0.5V P-P
IC4001 (14) PB 2.8V P-P
IC4001 (14) REC 2.7V P-P
IC4001 (23) REC 0.1V P-P
IC4001 (26) PB 8.6V P-P
IC4001 (34) REC 1.2V P-P

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER DURING PLAYBACK . (PAL MODE)

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

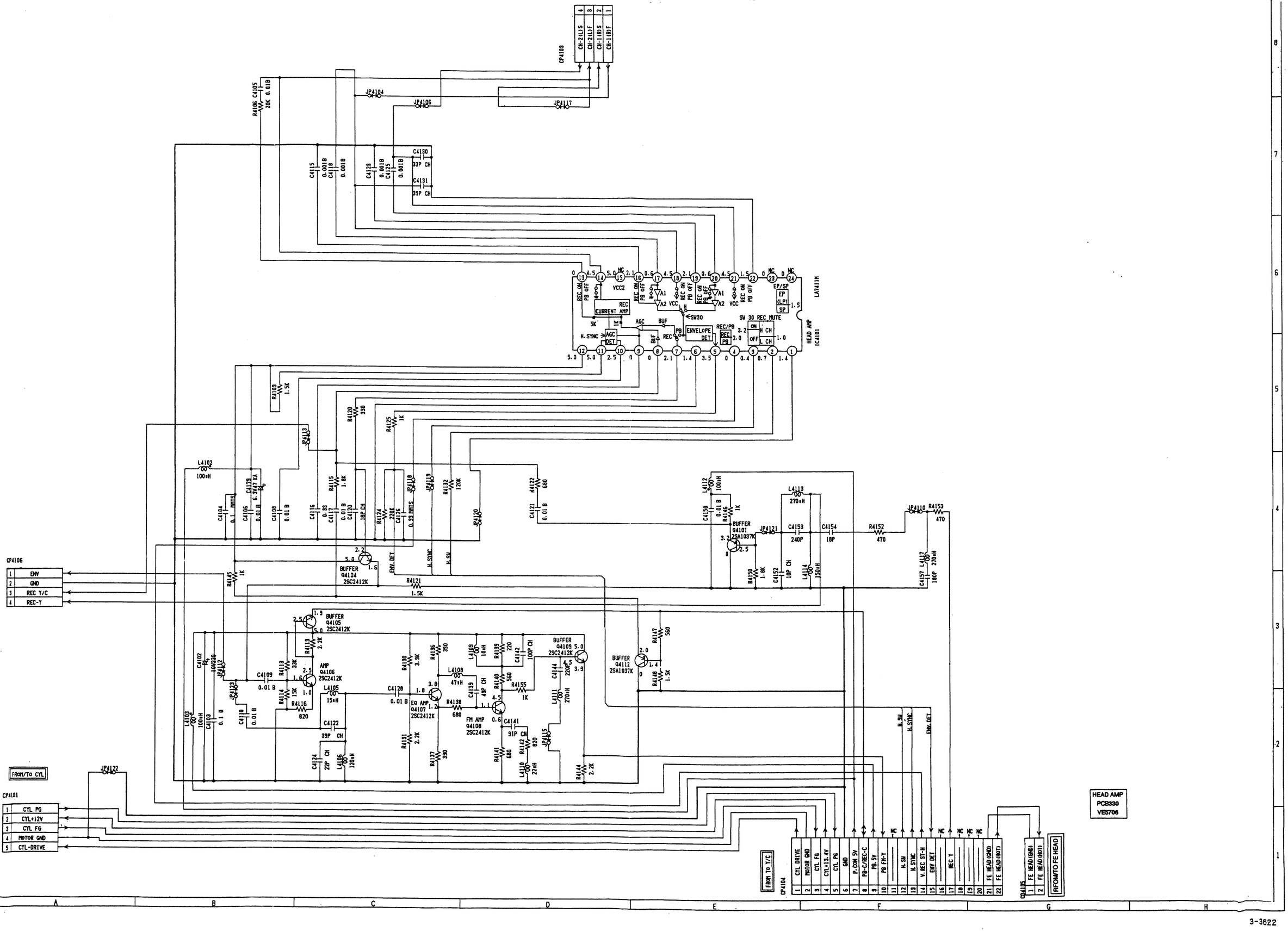
TUNER/AUDIO SCHEMATIC DIAGRAM



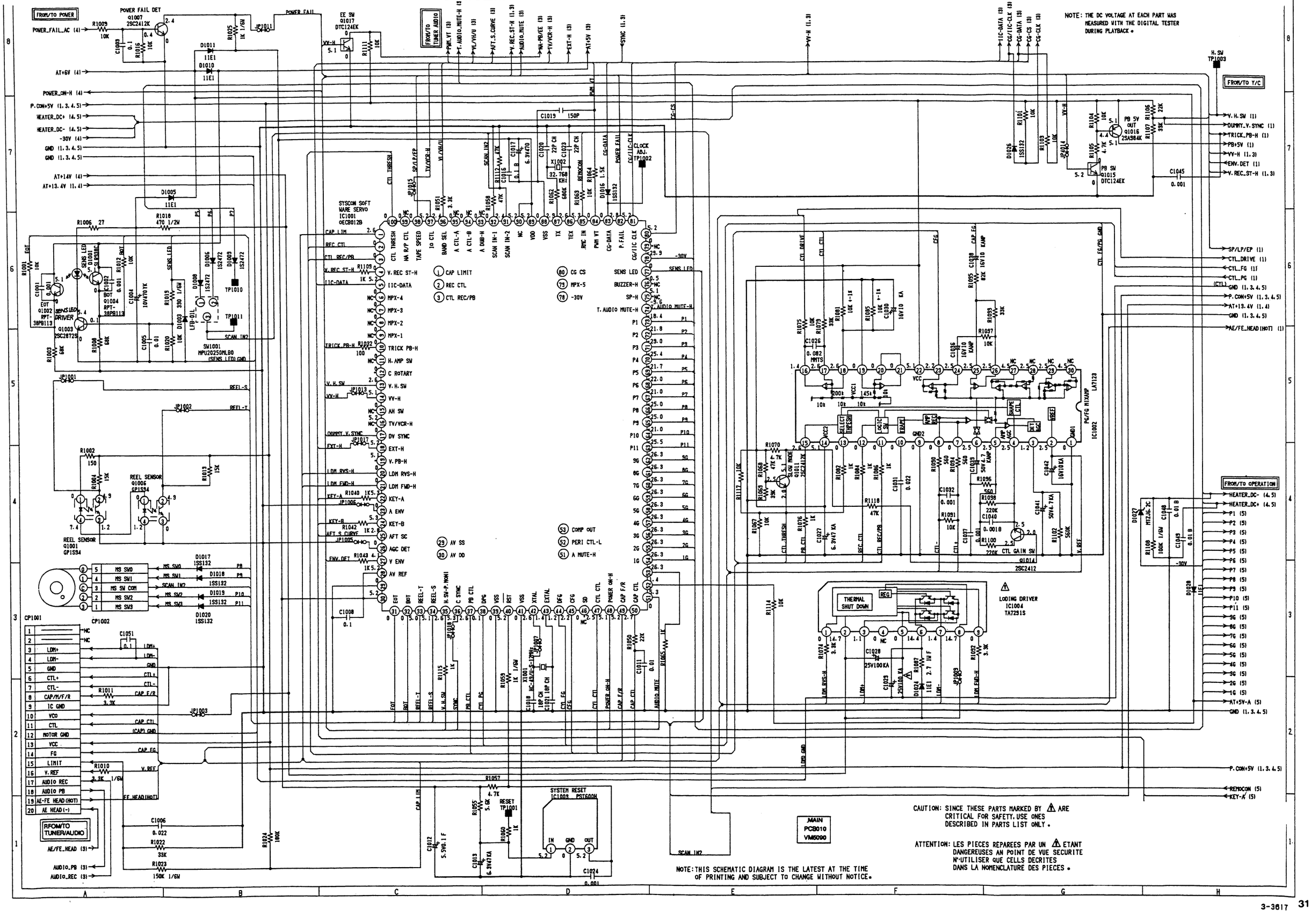
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER DURING PLAYBACK.

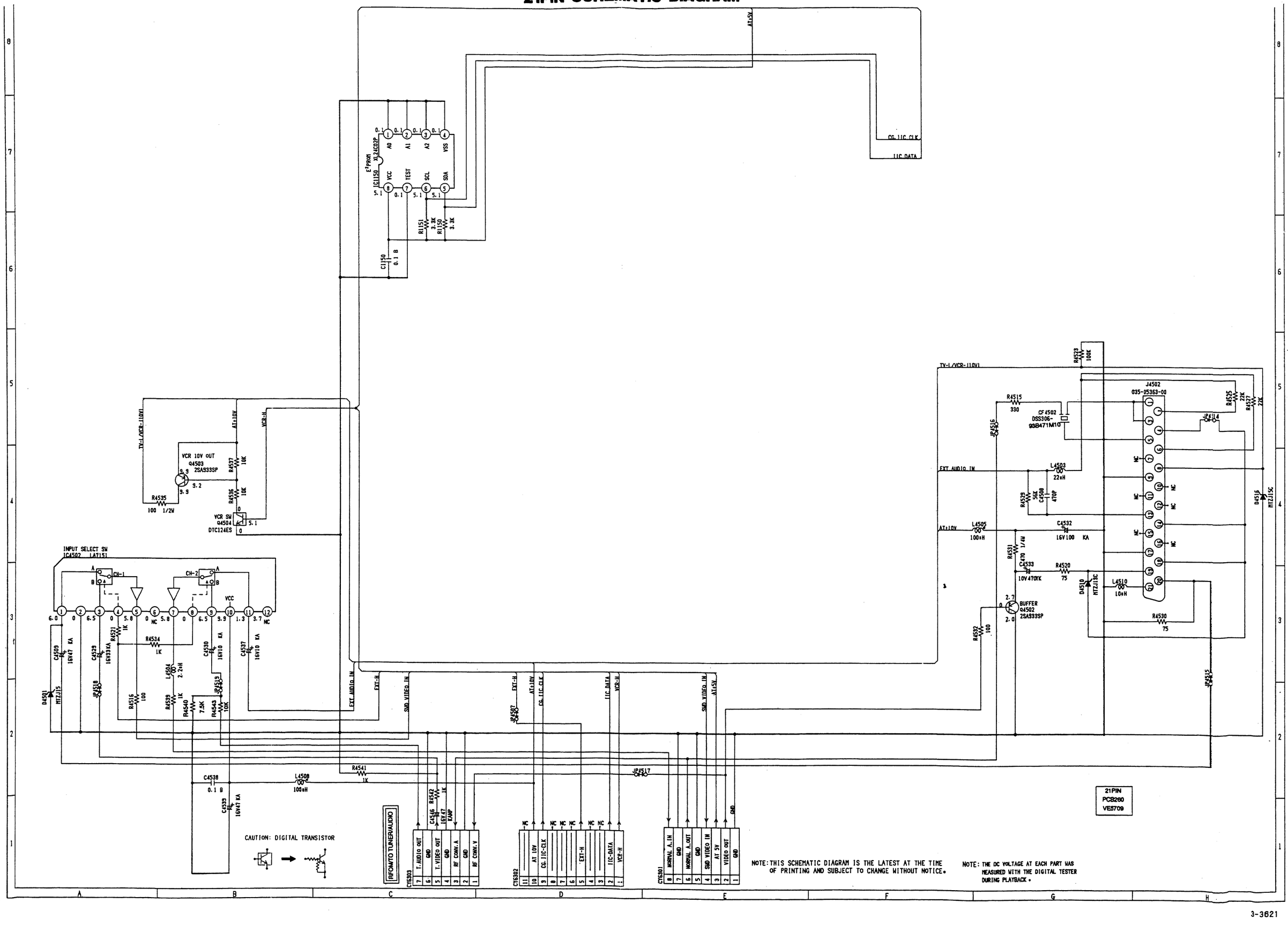
HEAD AMP SCHEMATIC DIAGRAM



SYSTEM CONTROL/SERVO SCHEMATIC DIAGRAM



21PIN SCHEMATIC DIAGRAM

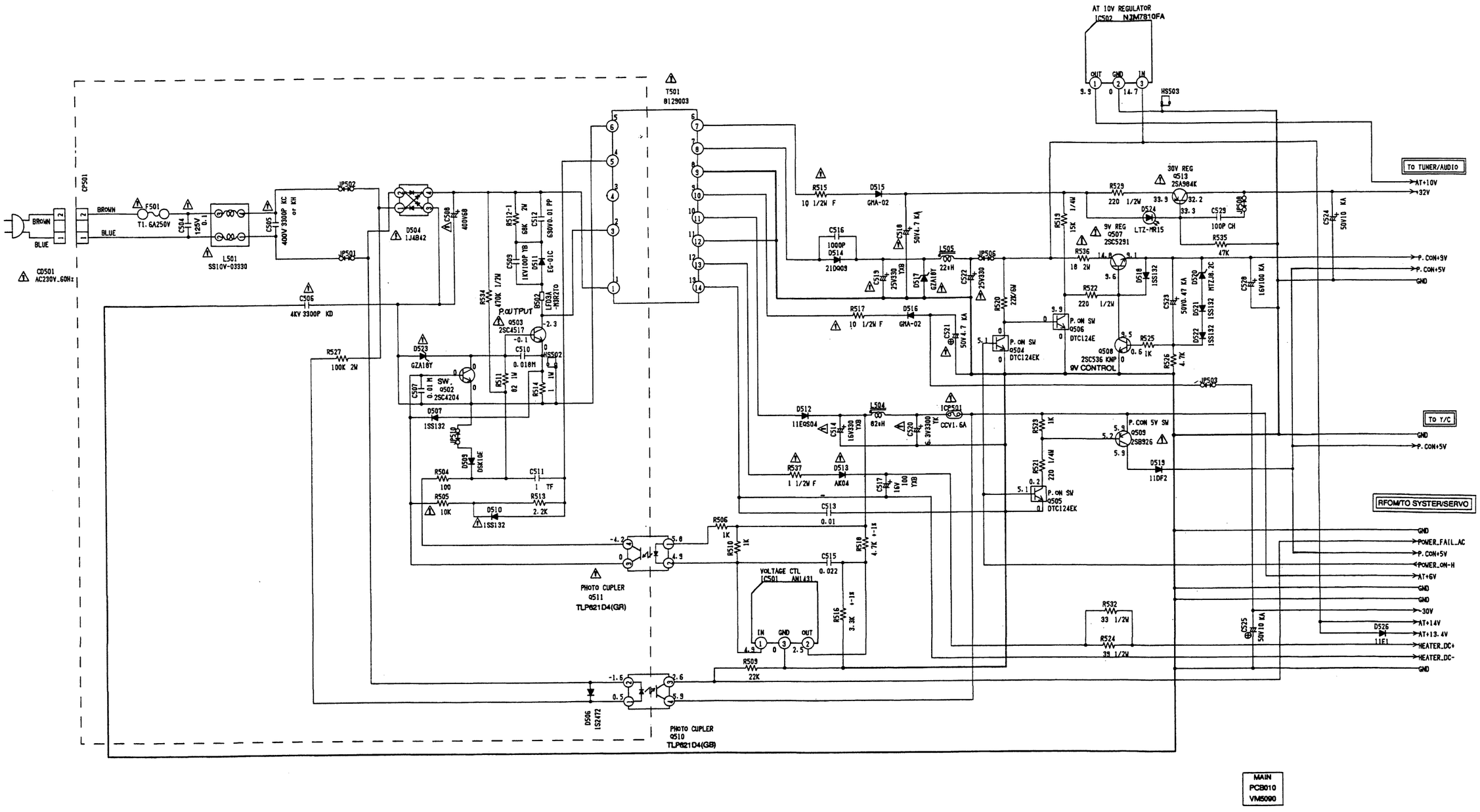


CAUTION: DIGITAL TRANSISTOR

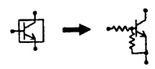
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER DURING PLAYBACK.

POWER SCHEMATIC DIAGRAM



CAUTION: DIGITAL TRANSISTOR



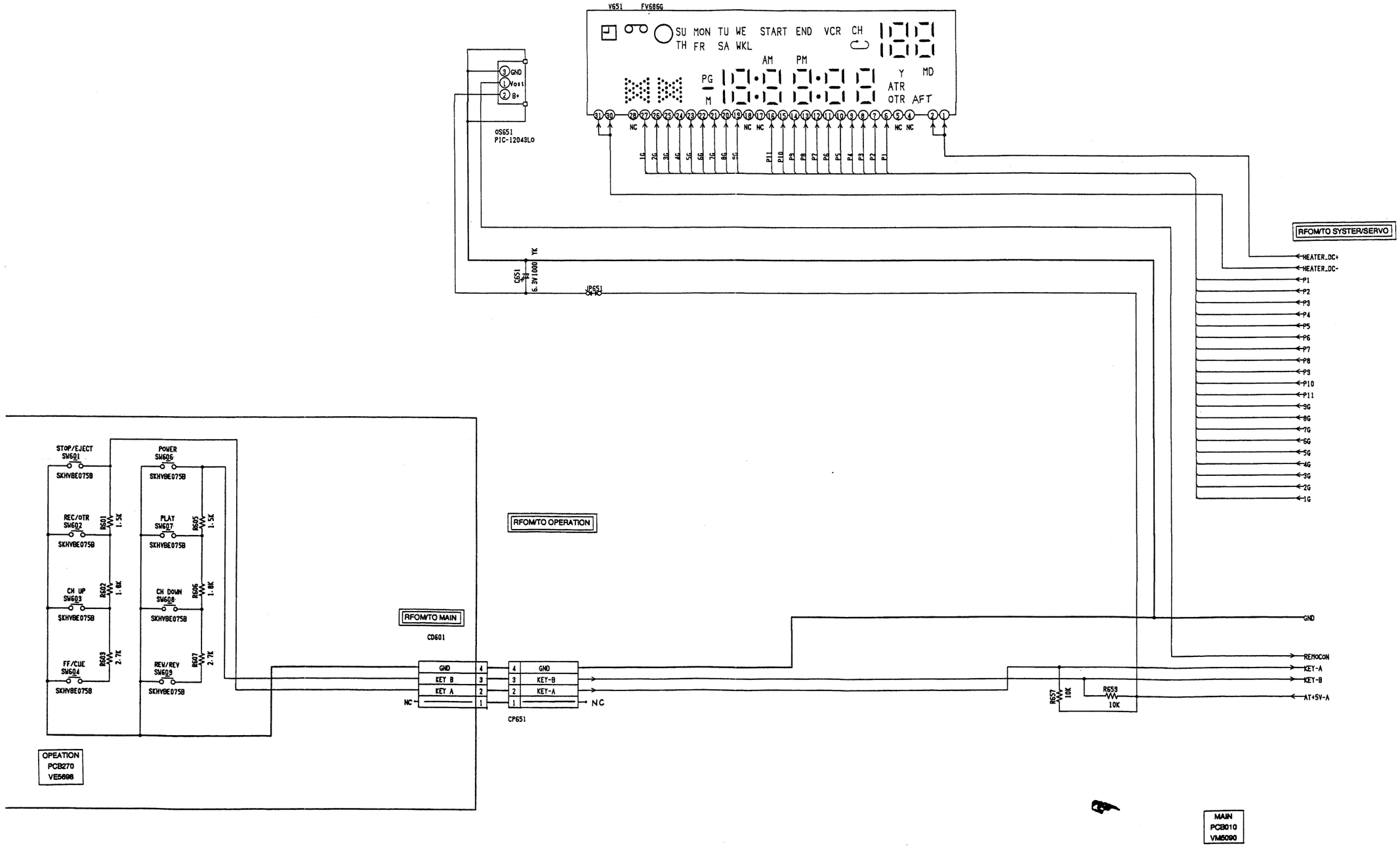
ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES.

CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY. USE ONES DESCRIBED ON PARTS LIST ONLY.

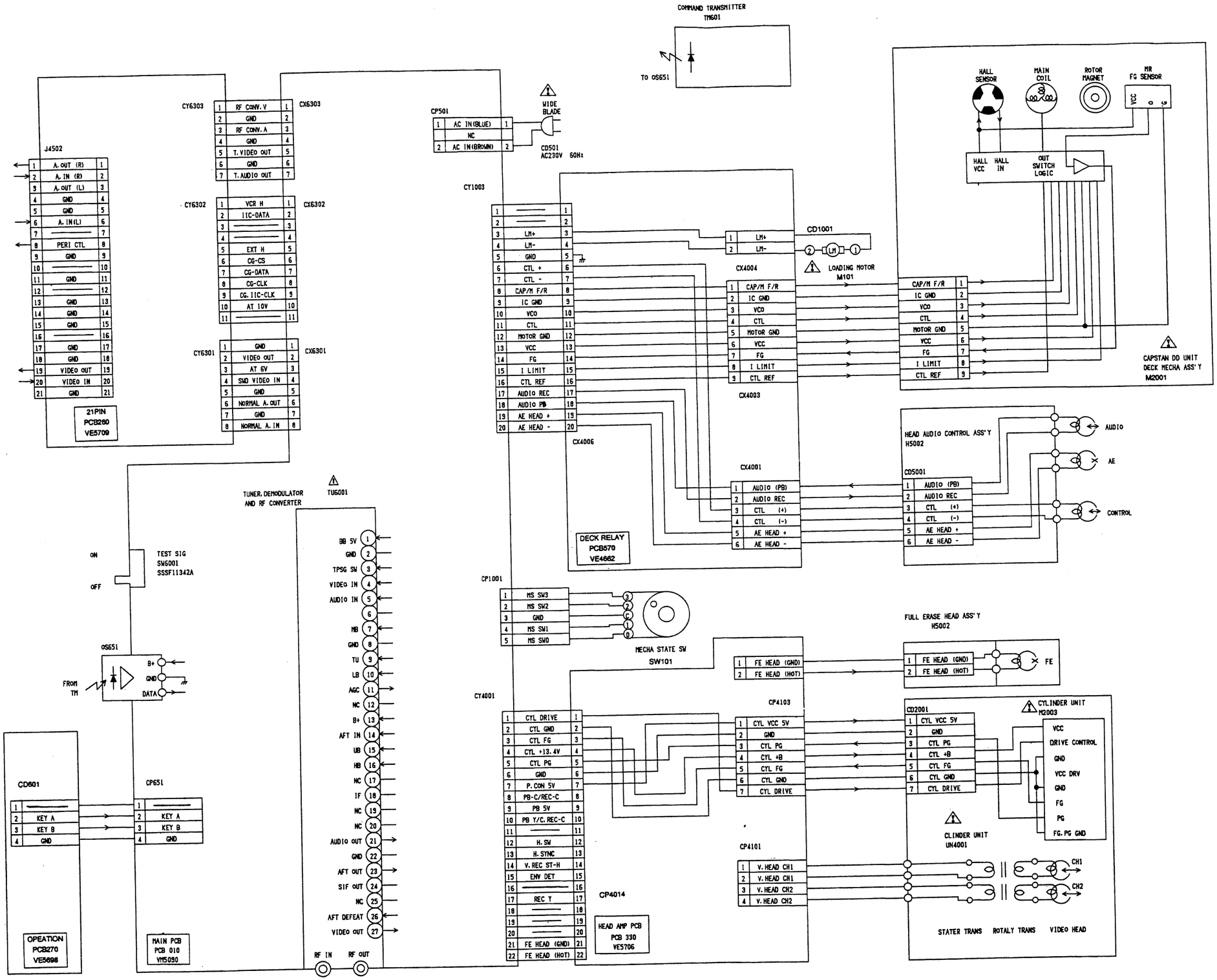
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER DURING PLAYBACK.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

OPERATION SCHEMATIC DIAGRAM



INTERCONNECTION DIAGRAM

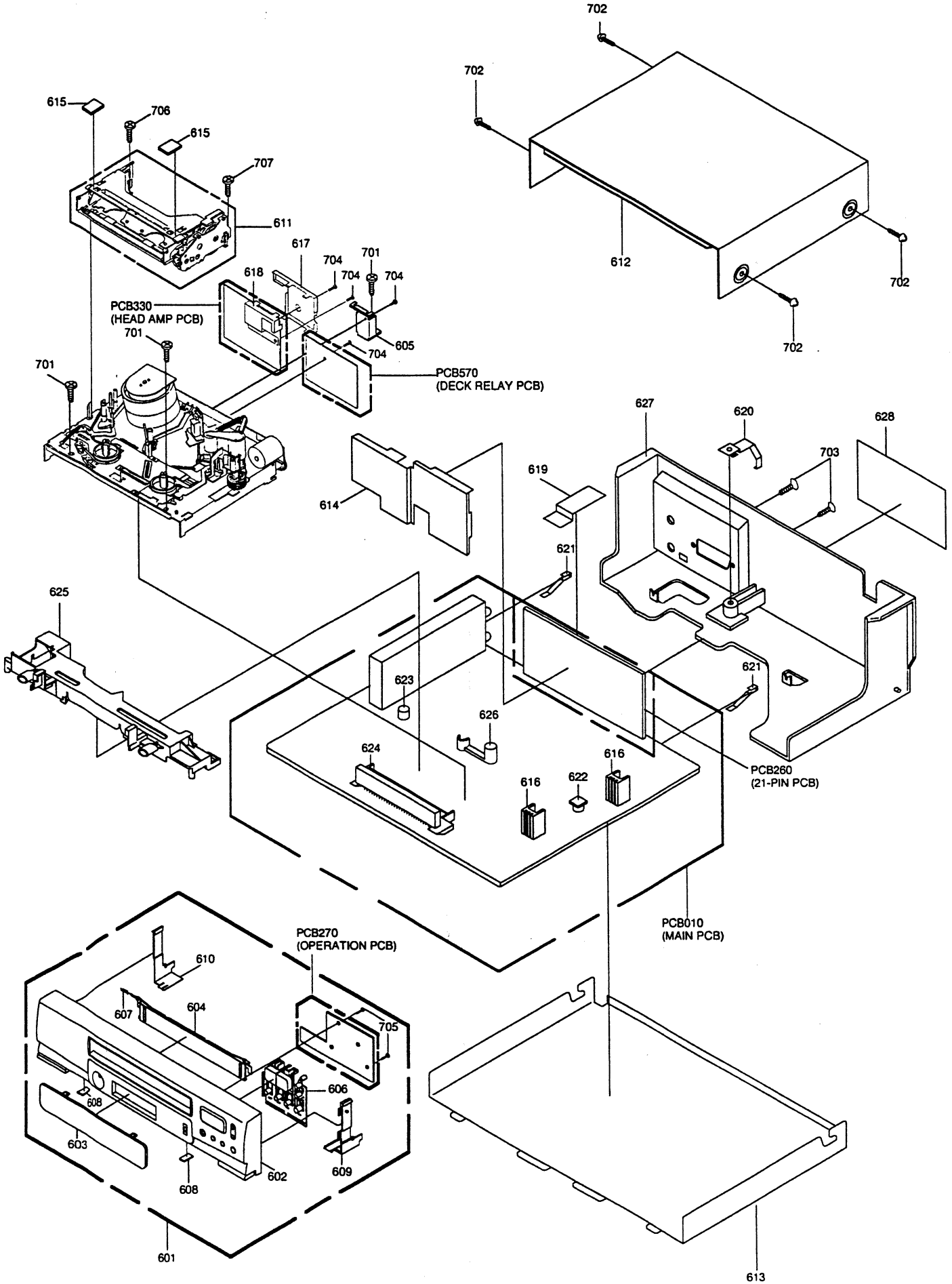


CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY. USE ONES DESCRIBED IN PARTS LIST ONLY.

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES.

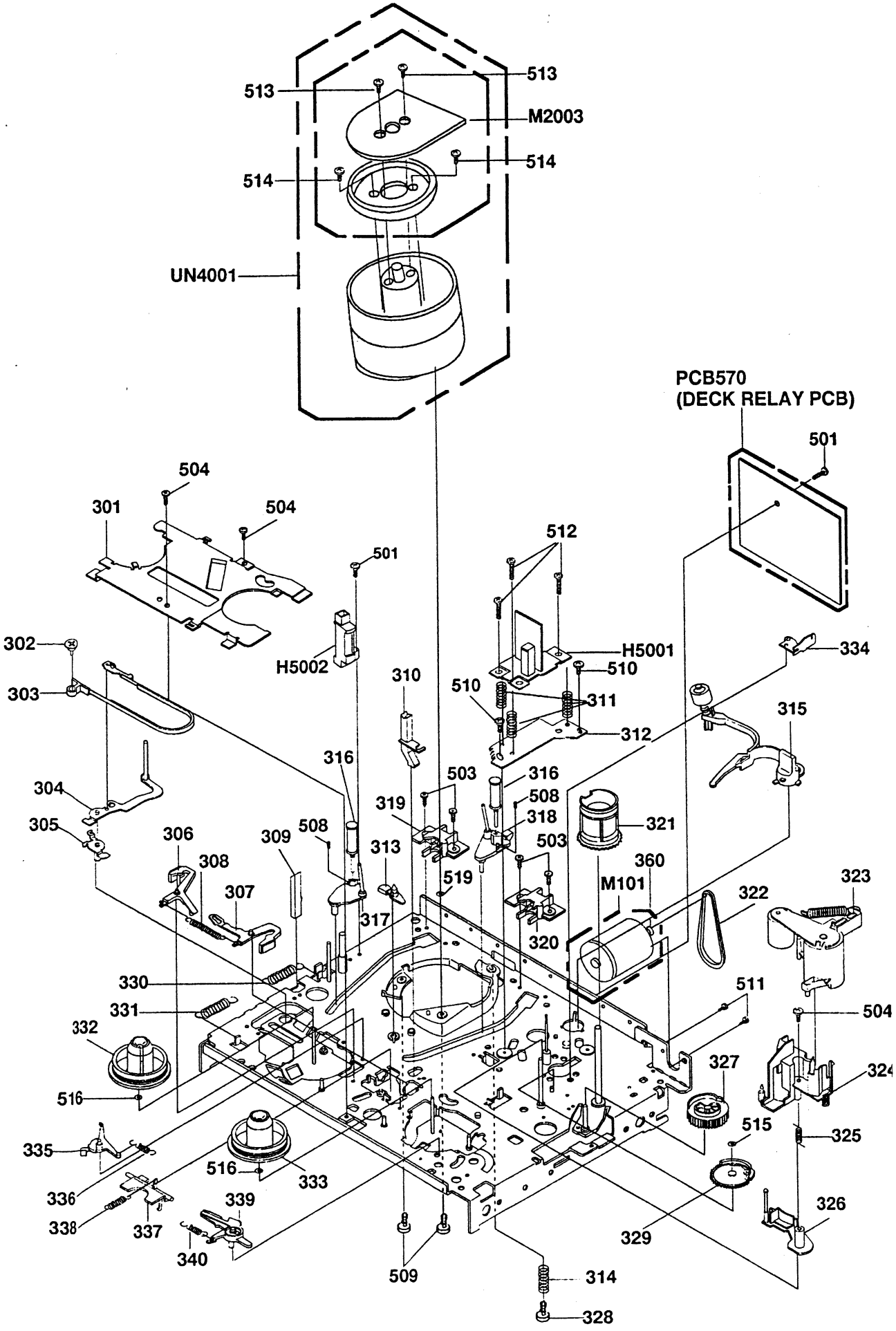
NOTE: THIS INTERCONNECTION DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

MECHANICAL EXPLODED VIEW



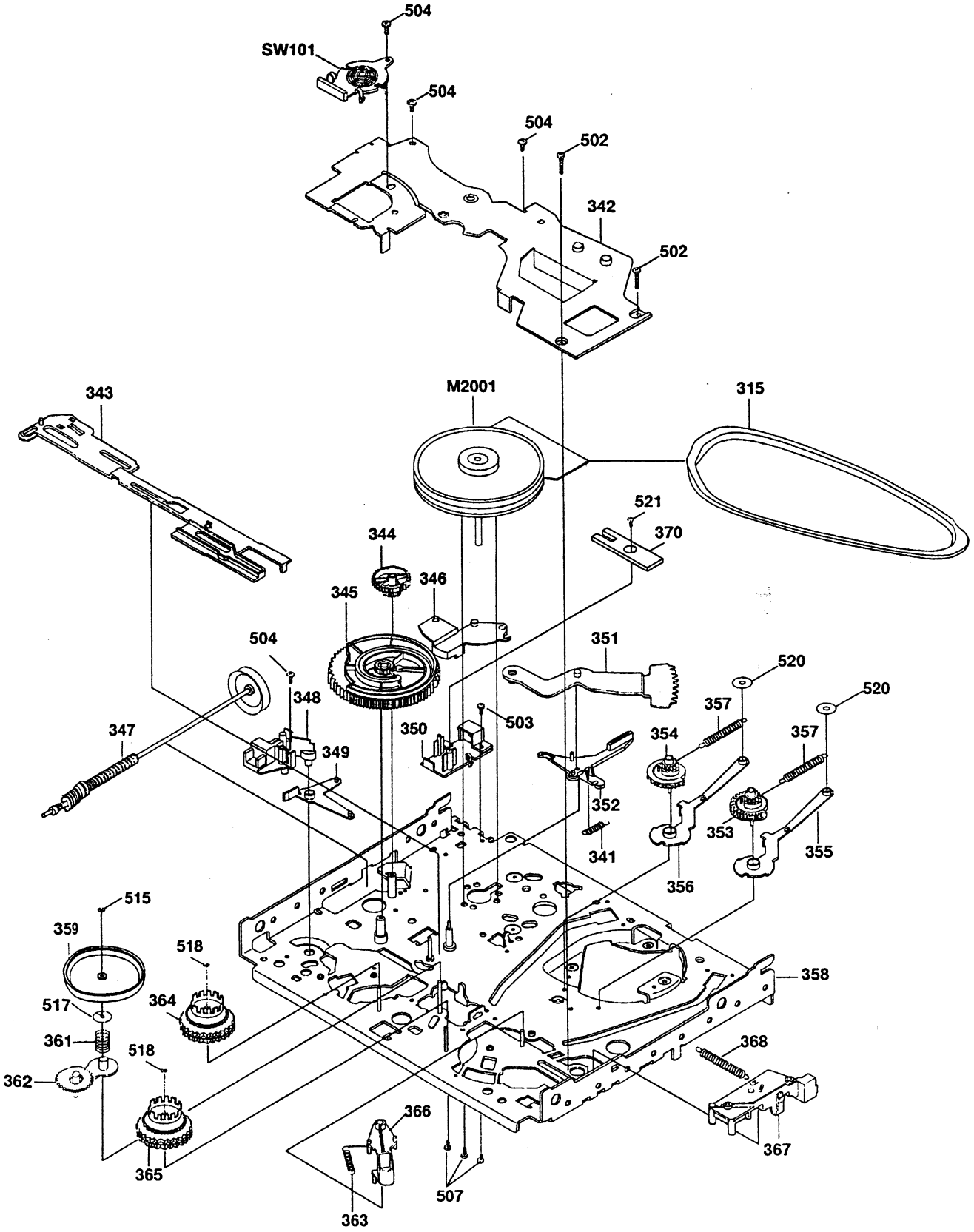
4-3054

CHASSIS EXPLODED VIEW (TOP VIEW)



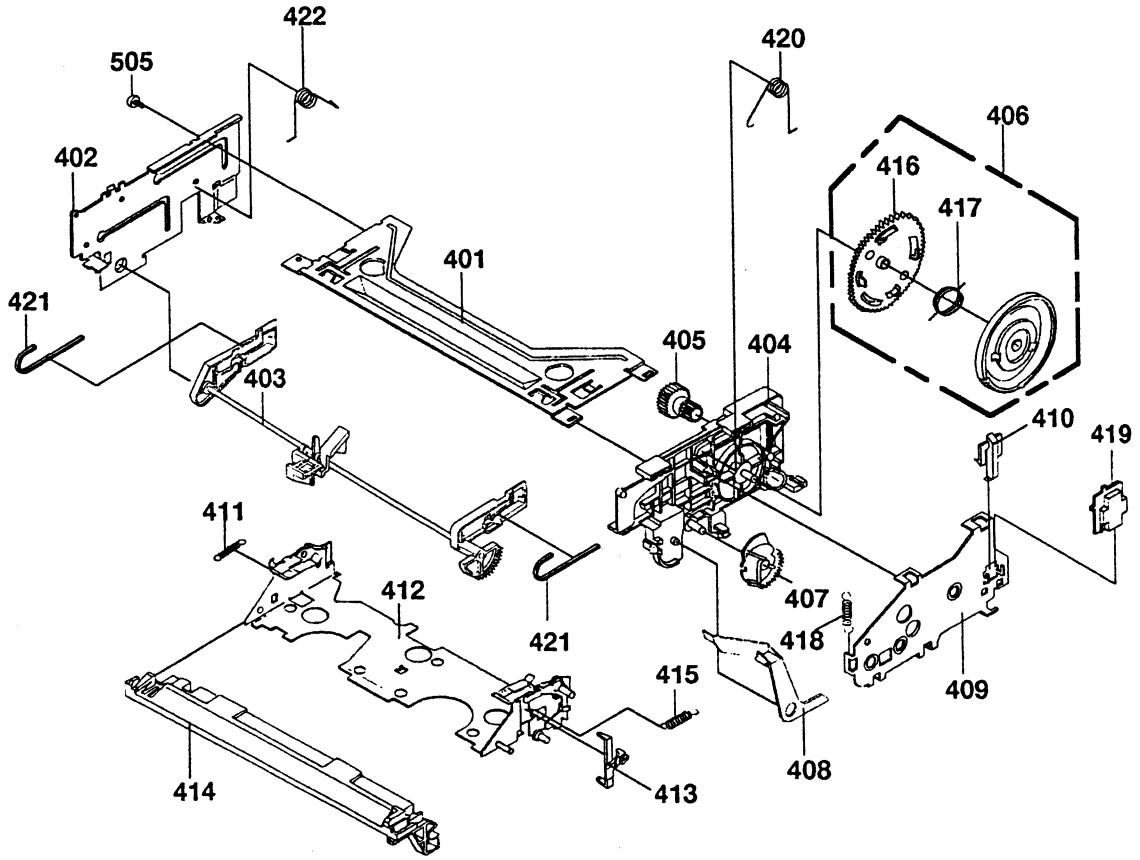
4-2987

CHASSIS EXPLODED VIEW (BOTTOM VIEW)



4-218 B

FRONT LOADING EXPLODED VIEW



4-3018

MECHANICAL REPLACEMENT PARTS LIST

REF.NO.	PART NO.	DESCRIPTION
601	A4A720B720	CABINET.FRONT ASS'Y
602	701WPJ0563	CABINET.FRONT
603	711WPD0276	PLATE.DISPLAY
604	712WPJ0343	FLAP
605	762WSA0024	ANGLE.DECK BACK
606	735WPD0190	BUTTON.DECK
607	743WKA0006	SPRING.FLAP
608	800WFA0001	CUSHION.LEG
609	761WPA0057	HOLDER.FRONT(R)
610	761WPA0058	HOLDER.FRONT(L)
611	A4A601A650	FRONT LOADING UNIT(FL-7A)
612	702USS0021	CABINET.TOP
613	702WSA0029	PLATE.BOTTOM
614	753WSA0072	SHIELD.PLATE 21PIN
615	----	CUSHION 10*15*T3
616	----	HEAT SINK
617	753WSA0068	SHIELD.CASE HEAD AMP
618	753WSA0069	SHIELD.COVER HEAD AMP
619	753WSA0058	PLATE.EARTH SYSCON
620	753WSA0063	PLATE.EARTH BOTTOM
621	753WUA0025	SPRING.EARTH M-PCB
622	754WPA0012	COVER.LED(R)
623	754WPA0013	COVER.LED(L)
624	756WPA0014	HOLDER.CLOCK
625	761WPA0046	HOLDER.DECK
626	850P700031	HOLDER.LED
627	702WPA0302	PANEL.BACK
628	7222022129	SHEET.RATING
701	8117140A24	SCREW.TAPPING(BO) PAN 4*12
702	8117540A02	SCREW.TAPPING(BO) TRUSS 4*10
703	8117430A02	SCREW.TAPPING(BO) OVAL 3*10
704	8107230604	SCREW.TAP TITE(S) BIND 3*6
705	8110226084	SCREW.TAP TITE(P) BIND 2.6*8
706	8107226504	SCREW.TAP TITE(S) BIND 2.6*8
707	8107226804	SCREW.TAP TITE(S) BIND 2.6*5
---	JB5V0500	POLYBAG
---	J3A20702V	GUARANTEE CARD
---	J4A72001V	INSTRUCTION BOOK
---	J4A72007V	QUICK SET-UP SHEET
---	J4374228V	WARNING SHEET
---	J4802020V	DEW CAUTION SHEET
---	791UHA0005	GIFT SHEET
---	792UHA0072	PACKAGE
---	793UCD0801	GIFT BOX

CHASSIS/FRONT LOADING REPLACENT PARTS LIST

REF.NO.	PART NO.	DESCRIPTION
301	850P600471	BRACKET.BRAKE
302	850P400358	ADJUST.TENSION
303	850A400122	TENSION BAND ASS'Y
304	850A400124	TENSION ARM ASS'Y
305	850A400123	TENSION LEVER 2 ASS'Y
306	850A600155	MAIN BRAKE S ASS'Y
307	850A600156	MAIN BRAKE T ASS'Y
308	850P800252	SPRING.MAIN BRAKE
309	850P900564	REFLECTOR.EOT
310	850P400347	REFLECTOR.LED
311	850P800269	SPRING.AC HEAD
312	850P500060	BASE.AC HEAD
313	850P000394	POST.CASS GUIDE L
314	850P800245	SPRING.AZIMUTH 2
315	850A500013	AHC ASS'Y
316	850A400129	GUIDE ROLLER ASS'Y
317	850A400126	BASE.S INCLINED ASS'Y
318	850A400127	BASE.T INCLINED ASS'Y
319	850P400400	CATCHER S
320	850P400401	CATCHER T
321	850P400343	CAM.PINCH ROLLER
322	850P600487	BELT.LOADING
323	850A400117	PINCH ROLLER BLOCK
324	850P900541	CASS.OPENER
325	850P800264	SPRING.P5
326	850A400120	P5 ARM ASS'Y
327	850P400342	CAM GEAR
328	8146230A14	JOINT SCREW BIND M3*11
329	850P400344	CAM.P5
330	850P400356	SPRING.TENSION ARM 2
331	850P400357	SPRING.TENSION ARM 1
332	850P200216	REEL S
333	850P200217	REEL T
334	850P400402	CATCHER.P5 2
335	850P600465	SUB BRAKE S
336	850P800253	SPRING.S-S BRAKE
337	850P200214	ARM.JOINT
338	850P800262	SPRING.JOINT ARM
339	850A600157	SUB BRAKE T ASS'Y
340	850P800254	SPRING.T-S BRAKE
341	850P800255	SPRING.CAP BRAKE
342	850P600485	PLATE.BOTTOM
343	850A600160	ROD.MAIN ASS'Y
344	850P400341	GEAR.MIDDLE
345	850P600472	CAM.MAIN
346	850P600468	LEVER.MAIN BRAKE
347	850A600159	WORM ASS'Y
348	850P600483	BRACKET.WORM F
349	850P600474	LEVER.RATCHET
350	850P600484	BRACKET.WORM R
351	850P300151	LEVER.LOADING
352	850A600174	CAPSTAN BRAKE ASS'Y (M.J)
353	850P300152	GEAR.LOADING S
354	850P300153	GEAR.LOADING T
355	850A300053	LOADING ARM S ASS'Y
356	850A300054	LOADING ARM T ASS'Y
357	850P800263	SPRING.LOADING GEAR
358	850A000173	MAIN CHASSIS ASS'Y
359	850P200213	CENTER PULLEY
360	850P600486	PULLEY.LDM 5
361	850P800261	SPRING.C-PULLEY
362	850A200051	ARM IDLER ASS'Y
363	850P800270	SPRING.LEVER TENSION
364	850A200050	CLUTCH GEAR T ASS'Y
365	850A200049	CLUTCH GEAR S ASS'Y
366	850P400360	LEVER.TENSION
367	850P400359	HOLDER.TENSION
368	850P800256	SPRING.MAIN ROD

REF.NO.	PART NO.	DESCRIPTION	
369	850P200215	BELT.CAPSTAN	
370	850P600519	STOPPER.CAPSTAN	
401	850P900542	BRACKET.TOP	
402	850P900556	BRACKET.SIDE L	
403	850A900149	LINK ASS'Y (VR)	
404	850P900566	BRACKET.SIDE R1	
405	850P900561	GEAR.JOINT	
406	850A900159	GEAR.CAM ASS'Y	
407	850P900562	GEAR.LINK R	
408	850P900594	LEVER.FLAP 2	
409	850P900568	BRACKET.SIDE R2	
410	850P900570	REFLECTOR.BOT	
411	850P800267	SPRING.LOCKER L	
412	850A900147	CASS HOLDER ASS'Y	
413	850P900552	REMOVING	
414	850P900567	TAPE GUIDE.PIECE	
415	850P800268	SPRING.LOCKER R	
416	850P900559	GEAR.CLUTCH	
417	850P900560	SPRING.CLUTCH	
418	850P800293	SPRING.LEVER FLAP 2	
419	850P900596	COVER.SENSOR(BOT)	
420	850P800290	SPRING.EARTH	
421	850P900557	SPRING.LINK	
422	850P800272	SPRING.BRACKET L	
501	8107230604	SCREW.TAP TITE(S) BIND	3*6
502	8109226A64	SCREW.TAP TITE(B) BIND	2.6*16
503	8107226804	SCREW.TAP TITE(S) BIND	2.6*8
504	8107226604	SCREW.TAP TITE(S) BIND	2.6*6
505	8107226504	SCREW.TAP TITE(S) BIND	2.6*5
506	8107226404	SCREW.TAP TITE(S) BIND	2.6*4
507	8110126604	SCREW.TAP TITE(P) PAN	2.6*6
508	815DJ20302	SET SCREW 6 CUP POINT	M2*3
509	810A130604	SCREW/WASHER(A)	M3*6
510	810B126604	SCREW/WASHER(B)	M2.6*6.0
511	8102130304	SCREW.PAN	M3.0*3.0
512	8102126A04	SCREW.PAN	M2.6*10
513	810A123504	SEMS A	M2.3*5.0
514	850PAA0197	SCREW.MOTOR	M3*5
515	82P266005N	POLYSLIDER WASHER(CUT)	2.6*6.0*T0.5
516	82Q264713N	POLYSLIDER WASHER	2.6*4.7*T0.13
517	82P26A005N	POLYSLIDER WASHER(CUT)	2.6*10*T0.5
518	82P166005N	POLYSLIDER WASHER(CUT)	1.6*6.0*T0.5
519	82Q3154B3N	POLYSLIDER WASHER	3.1*5.4*T0.13
520	83CST40000	CS-RING	4.0
521	8190226A84	SCREW.TAP TITE(B) BIND	2.6*18
CD1001	068722058A	CORD EIS CONNECTOR	8722058A
CD2001	122W060803	CORD JUMPER	2W060803
CD5001	122B050901	CORD JUMPER	2B050901
CX4001	0694760509	CONNECTOR PCB SIDE	177640-6
CX4003	069779M010	CONNECTOR PCB SIDE	TKC-F09X-L1
CX4004	0694220139	CONNECTOR PCB SIDE	173979-2
CX4006	0697FK0080	CONNECTOR PCB SIDE	TMC-N20X-B1
H5001	1523D91020	HEAD AUDIO CONTROL	HVMZA1210A
H5002	1543D02008	HEAD FULL ERASE	HVFHF0053A
⚠ M101	1596P58008	MOTOR.LOADING	MXN-13FB12F
⚠ M2001	1594J98001	CAPSTAN.DD UNIT	SP39BA
⚠ M2003	1589V11003	MICRO MOTOR	EP13CC
SW101	0520244003	SWITCH ROTARY	SRZZ0B064A
PCB570	A4A702A570	DECK RELAY PCB ASS'Y	VE4662
⚠ UN4001	A4A705A500	CYLINDER UNIT ASS'Y	A4A705A500

THIS ELECTRICAL PARTS LIST IS STANDARD PART LIST. BUT
INTERCHANGEABLE PARTS MAY BE USED IN THE UNIT.
SEE THE INTERCHANGEABLE PARTS LIST AFTER THE STANDARD PARTS LIST.

ELECTRICAL REPLACEMENT PARTS LIST

REF.NO.	PART NO.	DESCRIPTION
RESISTORS		
⚠ R505	R001T6103J	RC 10K OHM 1/6W
⚠ R511	R3K181820J	R.METAL 82 OHM 1W
⚠ R512	R3K28A683J	R.METAL OXIDE 68K OHM 2W
⚠ R514	R3K181010J	R.METAL 1.0 OHM 1W
⚠ R515	R61582100J	R.FUSE 10 OHM 1/2W
⚠ R517	R635U2100J	R.FUSE 10 OHM 1/2W
R527	R3K28A104J	R.METAL OXIDE 100K OHM 2W
⚠ R536	R3K28A180J	R.METAL OXIDE 18 OHM 2W
⚠ R537	R63502010J	R.FUSE 1 OHM 1/2W
⚠ R1087	R635812R7J	R.FUSE 2.7 OHM 1W
CAPACITORS		
⚠ C504	P2470A104M	CMP 0.1 UF 125V
⚠ C505	CA3PF0KL3M	CC 0.0033UF 400V
⚠ C506	CA30309L3M	CC 0.0033UF 4KV
⚠ C508	E02TFH680M	CE 68 UF 400V
C509	C0J0B0612K	CC 100 PF 1KV B
C512	P312F5103J	CPP 0.01 UF 630V
⚠ C514	E02RT2331M	CE 330 UF 16V
⚠ C517	E02RT0101M	CE 100 UF 16V
⚠ C518	E50HU54R7M	CE 4.7 UF 50V
⚠ C519	E02RT3331M	CE 330 UF 25V
⚠ C520	E0ELF0332M	CE 3300 UF 6.3V
⚠ C521	E50HU54R7M	CE 4.7 UF 50V
⚠ C522	E02RT3331M	CE 330 UF 25V
C6347	CHG0B0413J	CC 0.001 UF 50V B
SEMICONDUCTORS		
⚠ D504	D2501J4B42	DIODE 1J4B42
D506	D1VT024720	DIODE.SILICON 1S2472T-77
D507	D1VT001320	DIODE.SILICON 1SS132T-77
D509	D23TDSK10E	DIODE.RECTIFIER DSK10E-BT
⚠ D510	D1VT001320	DIODE.SILICON 1SS132T-77
D511	D28T0EG01C	DIODE.RECTIFER EG-01C
D512	D28TEQS040	DIODE.SCHOTTKY 11EQS04TA1
⚠ D513	D2BT0AK040	DIODE.SCHOTTKY BARRIER AK04V0
D514	D28T1DQ090	DIODE.RECTIFIER 21DQ09-TA2B1
D515	D13TGMA020	DIODE.SILICON GMA-02-BT
D516	D13TGMA020	DIODE.SILICON GMA-02-BT
⚠ D517	D93T01800Y	DIODE.ZENER GZA18 Y BT
D518	D1VT001320	DIODE.SILICON 1SS132T-77
D519	D28T11DF20	DIODE.SILICON 11DF2-TA2B2
D520	D97U08R21C	DIODE.ZENER MTZJ8.2C T-77
D521	D1VT001320	DIODE.SILICON 1SS132T-77
D522	D1VT001320	DIODE.SILICON 1SS132T-77
⚠ D523	D93T01800Y	DIODE.ZENER GZA18 Y BT
D524	DB7T2MR150	SEALED LED LTZ-MR15-T77
D526	D28T011E10	DIODE.SILICON 11E1TA1
D1001	0001300030	LED SLR-938C-4-AB
D1003	DD3RLFB01L	DIODE.SILICON LFB-01L
D1005	D28T011E10	DIODE.SILICON 11E1TA1
D1006	D1VT024720	DIODE.SILICON 1S2472T-77
D1008	D1VT024720	DIODE.SILICON 1S2472T-77
D1009	D1VT024720	DIODE.SILICON 1S2472T-77
D1010	D28T011E10	DIODE.SILICON 11E1TA1
D1011	D28T011E10	DIODE.SILICON 11E1TA1
D1016	D1VT001320	DIODE.SILICON 1SS132T-77
D1017	D1VT001320	DIODE.SILICON 1SS132T-77
D1018	D1VT001320	DIODE.SILICON 1SS132T-77
D1019	D1VT001320	DIODE.SILICON 1SS132T-77
D1020	D1VT001320	DIODE.SILICON 1SS132T-77
D1024	D28T011E10	DIODE.SILICON 11E1TA1
D1026	D1VT001320	DIODE.SILICON 1SS132T-77
D1027	D97U06R21C	DIODE.ZENER MTZJ6.2C T-77
D1028	D28T011E10	DIODE.SILICON 11E1TA1
D4001	D1VTB721QQ	DIODE.SCHOTTKY RB721Q
D4501	D97U015010	DIODE.ZENER MTZJ15 T-77
D4510	D97U01301C	DIODE.ZENER MTZJ13C T-77
D4516	D97U01501C	DIODE.ZENER MTZJ15C T-77
D5001	D1VT001320	DIODE.SILICON 1SS132T-77
D5002	D94TA6R8J2	DIODE.ZENER HZS6R8JB2-TE
D6301	D97U05R11C	DIODE.ZENER MTZJ5.1C T-77
D6302	D28T011E10	DIODE.SILICON 11E1TA1
D6304	D28T011E10	DIODE.SILICON 11E1TA1
IC501	I01J914310	IC AN1431T-(TA)
IC502	I0QA97810F	IC NJM7810FA
IC1001	I50F5B012B	IC OECB012B
IC1002	I93J407123	IC LA7123
IC1003	I9UJ0T600H	IC PST600H
⚠ IC1004	I05S07291S	IC TA7291S
IC1150	IC4D04C020	IC XL24C02P
IC4001	I03D37449L	IC LA7449L
IC4002	I53D399700	IC LC89970
IC4101	I03FG7411M	IC LA7411M-TP-T

REF.NO.	PART NO.	DESCRIPTION
SEMICONDUCTORS (CONT.)		
IC4502	I03S071510	IC LA7151
IC5001	I03D772860	IC LA7286
IC6301	I03F071050	IC LA7105M-TP-T1
IC6302	I03S06358T	IC LA6358ST
IC6303	I0MI90574J	IC UPC574J-T
Q502	TC3T042040	TRANSISTOR.SILICON 2SC4204-AA
⚠ Q503	TCB0045170	TRANSISTOR.SILICON 2SC4517
Q504	TNYTC05001	COMPOUND TRANSISTOR DTC124EKT147
Q505	TNYTC05001	COMPOUND TRANSISTOR DTC124EKT147
Q506	TNYTC03001	COMPOUND TRANSISTOR DTC124ESTP
⚠ Q507	TC3T052910	TRANSISTOR.SILICON 2SC5291-AY
Q508	TC3T0536K0	TRANSISTOR.SILICON 2SC536K-NP
⚠ Q509	TBWT009260	TRANSISTOR.SILICON 2SB926-AA
⚠ Q510	0002500470	PHOTO COUPLER TLP621D4(GB)
⚠ Q511	0002500480	PHOTO COUPLER TLP621D4(GR)
⚠ Q513	TAWT0984K0	TRANSISTOR.SILICON 2SA984K-AA
Q1001	0002G00490	PHOTO COUPLER GP1S94
Q1002	0000700320	TRANSISTOR PHOTO RPT-38PB113
Q1003	TCYT2872S0	TRANSISTOR.SILICON 2SC2872S
⚠ Q1004	0000700320	TRANSISTOR PHOTO RPT-38PB113
Q1006	0002G00490	PHOTO COUPLER GP1S94
Q1007	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q1011	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q1014	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q1015	TNYTC05001	COMPOUND TRANSISTOR DTC124EKT147
Q1016	TAWT0984K0	TRANSISTOR.SILICON 2SA984K-AA
Q1017	TNYTC05001	COMPOUND TRANSISTOR DTC124EKT147
Q4001	T6YA1037K0	TRANSISTOR.SILICON 2SA1037KT147
Q4003	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q4014	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q4039	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q4040	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q4101	T6YA1037K0	TRANSISTOR.SILICON 2SA1037KT147
Q4104	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q4105	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q4106	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q4107	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q4108	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q4109	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q4112	T6YA1037K0	TRANSISTOR.SILICON 2SA1037KT147
Q4301	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q4502	TAYT0933S0	TRANSISTOR.SILICON 2SA933STP(R.S)
Q4503	TAYT0933S0	TRANSISTOR.SILICON 2SA933STP(R.S)
Q4504	TNYTC03001	COMPOUND TRANSISTOR DTC124ESTP
Q5001	TCKT013170	TRANSISTOR SILICON 2SC1317-T
Q6303	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q6304	T82A037340	TRANSISTOR.SILICON 2SC3734
Q6305	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q6307	T6YA1037K0	TRANSISTOR.SILICON 2SA1037KT147
Q6308	T6YA1037K0	TRANSISTOR.SILICON 2SA1037KT147
Q6309	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q6310	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q6314	T8YA2412K0	TRANSISTOR.SILICON 2SC2412KT147
Q6315	TNYTC05001	COMPOUND TRANSISTOR DTC124EKT147
COILS & TRANSFORMERS		
⚠ L501	029X000070	COIL.LINE FILTER SS10V-03330
L504	021W66820K	COIL.CHOKE 82 UH
L505	021W66220M	COIL.CHOKE 22 UH
L4001	02167D101K	COIL 100 UH
L4003	02167D101K	COIL 100 UH
L4005	021LA68R2K	COIL 8.2 UH
L4006	021LA6100K	COIL 10 UH
L4018	021673101K	COIL 100 UH
L4026	021673101K	COIL 100 UH
L4102	021673101K	COIL 100 UH
L4103	021673101K	COIL 100 UH
L4105	021LA6150K	COIL 15 UH
L4106	021LA6121K	COIL 120 UH
L4108	021LA6470K	COIL 47 UH
L4109	021LA6100K	COIL 10 UH
L4110	021LA6220K	COIL 22 UH
L4111	021LA6271K	COIL 270 UH
L4112	021673101K	COIL 100 UH
L4113	021LA6271K	COIL 270 UH
L4114	021LA6151K	COIL 150 UH
L4117	021LA6271K	COIL 270 UH
L4302	021LA6220K	COIL 22 UH
L4503	021LA6220K	COIL 22 UH
L4504	021LA62R2K	COIL 2.2 UH
L4505	021673101K	COIL 100 UH
L4508	021673101K	COIL 100 UH
L4510	021LA6100K	COIL 10 UH
L5001	021673102K	COIL 1000 UH

ELECTRICAL REPLACEMENT PARTS LIST

REF.NO.	PART NO.	DESCRIPTION
		COILS & TRANSFORMERS (CONT.)
⚠ T501	0481290036	TRANSFORMER.SWITCHING 8129003
T5001	033626010R	COIL.BIAS OSC 3626010
		JACKS
J4502	063G100035	SOCKET.21PIN 035 0 5363 00
		SWITCHES
SW601	0504201T31	SWITCH.TACT SKHVBE075B
SW602	0504201T31	SWITCH.TACT SKHVBE075B
SW603	0504201T31	SWITCH.TACT SKHVBE075B
SW604	0504201T31	SWITCH.TACT SKHVBE075B
SW606	0504201T31	SWITCH.TACT SKHVBE075B
SW607	0504201T31	SWITCH.TACT SKHVBE075B
SW608	0504201T31	SWITCH.TACT SKHVBE075B
SW609	0504201T31	SWITCH.TACT SKHVBE075B
SW1001	0501A02002	PUSH SWITCH MPU20250MLB0
SW6301	0510U21022	SWITCH.SLIDE SSSF11342A
		P.C. BOARD ASSEMBLIES
PCB010	A4A720B01A	PCB ASS'Y VM5090A
PCB260	A4A720B26A	PCB ASS'Y VE5709A
PCB270	A4A720B27A	PCB ASS'Y VE5698A
PCB330	A52101A33A	PCB ASS'Y VE5706B
PCB570	A4A702A570	SEE CHASSIS/FRONT LOADING REPLACEMENT PARTS LIST
		MISCELLANEOUS
B502	024DT03582	CORE.BEADS LFD3A-M3R2T0
BT601	1412004004	BATTERY.MANGAN UM-4(GR)
⚠ CD501	1206655806	CORD.AC BUSH E2N 6FEET 06655806
CD601	06CE24049A	CORD.EIS CONNECTOR CE24049A
CP501	0694430100	CORD.UX CONNECTOR 2-173270-3
CP651	069E240529	CONNEC.PCB SIDE 8283 0412 00 000
CU012	800WF00020	CUSHION-B
CD6002	06CZL05015	RF CABLE PAL FTZ D-2070
CF4502	1162LTQ2M1	FILTER EMI DSS306-93B471M10
CP1001	06979K0040	CONNECTOR PCB SIDE TMC-N20P-E1
CP1002	0697150310	CONNECTOR PCB SIDE TAS-X05X-D1
CP4001	06979M0040	CONNECTOR PCB SIDE TMC-N22P-E1
CP4101	069R750499	CONNECTOR PCB SIDE 52492-0520
CP4103	069J740109	CONNECTOR PCB SIDE IMSA-9603S-04C
CP4104	0697FM0080	CONNECTOR PCB SIDE TMC-N22X-B1
CP4106	0694240139	CONNECTOR PCB SIDE 173979-4
CX6301	069J280028	CONNECTOR PCB SIDE IMSA-9115B-08
CX6302	069J2B0028	CONNECTOR PCB SIDE IMSA-9115B-11
CX6303	069J270028	CONNECTOR PCB SIDE IMSA-9115B-07
CY6301	069J280038	CONNECTOR PCB SIDE IMSA-9115S-08L
CY6302	069J2B0038	CONNECTOR PCB SIDE IMSA-9115S-11L
CY6303	069J270038	CONNECTOR PCB SIDE IMSA-9115S-07L
⚠ F501	080PT1R602	FUSE 1.6A 250V
FH501	06710T0006	HOLDER.FUSE EYF-52BC
FH502	06710T0006	HOLDER.FUSE EYF-52BC
⚠ ICP501	083PC1R602	MICRO FUSE CCV1.6A
OS651	077Q0D0010	REMOTE RECEIVER PIC-12043LO
TM601	076607224B	TRANSMITTER SBEG20058B
⚠ TU6001	0162701004	RF UNIT(MD+TU+IF) MRF7-UE34
V651	096775R701	TUBE FLUORSCENT DISPLAY FV686G
X1001	100CA01203	CRYSTAL HC-49/U-S 12.0MHZ
X1002	100C32R803	CRYSTAL DSVT-200 32.768KHZ
X4001	100WA4R303	CRYSTAL HC-49/U 4.43361895MHZ

RESISTOR
RC.....CARBON RESISTOR

CAPACITORS
CC.....CERAMIC CAPACITOR
CE.....ALUMI ELECTROLYTIC CAPACITOR
CP.....POLYESTER CAPACITOR
CPP.....POLYPROPYLENE CAPACITOR
CPL.....PLASTIC CAPACITOR
CMP.....METAL POLYESTER CAPACITOR
CMPL.....METAL PLASTIC CAPACITOR
CMPP.....METAL POLYPROPYLENE CAPACITOR
CST.....STYROL CAPACITOR

NOTE: THE FOLLOWING PART(S) MAY BE SUBSTITUTED FOR PARTS INDICATED IN THE ELECTRICAL REPLACEMENT PARTS LIST (WITH THE SAME REF.NO.). THESE PARTS SHARE THE SAME ELECTRICAL CHARACTERISTICS AND OTHER ELEMENTS FOR COMMON USAGE. EITHER PART NUMBER MAY BE USED IN THIS UNIT.

REF.NO.	BASE		REPLACEMENT	
	PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
D1005	D28T011E10	11E1TA1	D2WXN40020	1N4002
D1010	D28T011E10	11E1TA1	D2WXN40020	1N4002
D1011	D28T011E10	11E1TA1	D2WXN40020	1N4002
D1024	D28T011E10	11E1TA1	D2WXN40020	1N4002
D1028	D28T011E10	11E1TA1	D2WXN40020	1N4002
D520	D97U08R21C	1SS132T-77	D94TA8R2J2	HZS8R2JB2-TE
D526	D28T011E10	11E1TA1	D2WXN40020	1N4002
D6302	D28T011E10	11E1TA1	D2WXN40020	1N4002
D6304	D28T011E10	11E1TA1	D2WXN40020	1N4002
IC1150	IC4D04C020	XL24C02P	I57D04C020	BR24C02
IC501	I01J914310	AN1431T-(TA)	I02J910930	UPC1093J-T
⚠R1087	R635812R7J	2.7 OHM 1W	R615812R7J	S 2.7 OHM 1W